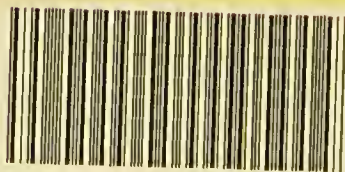


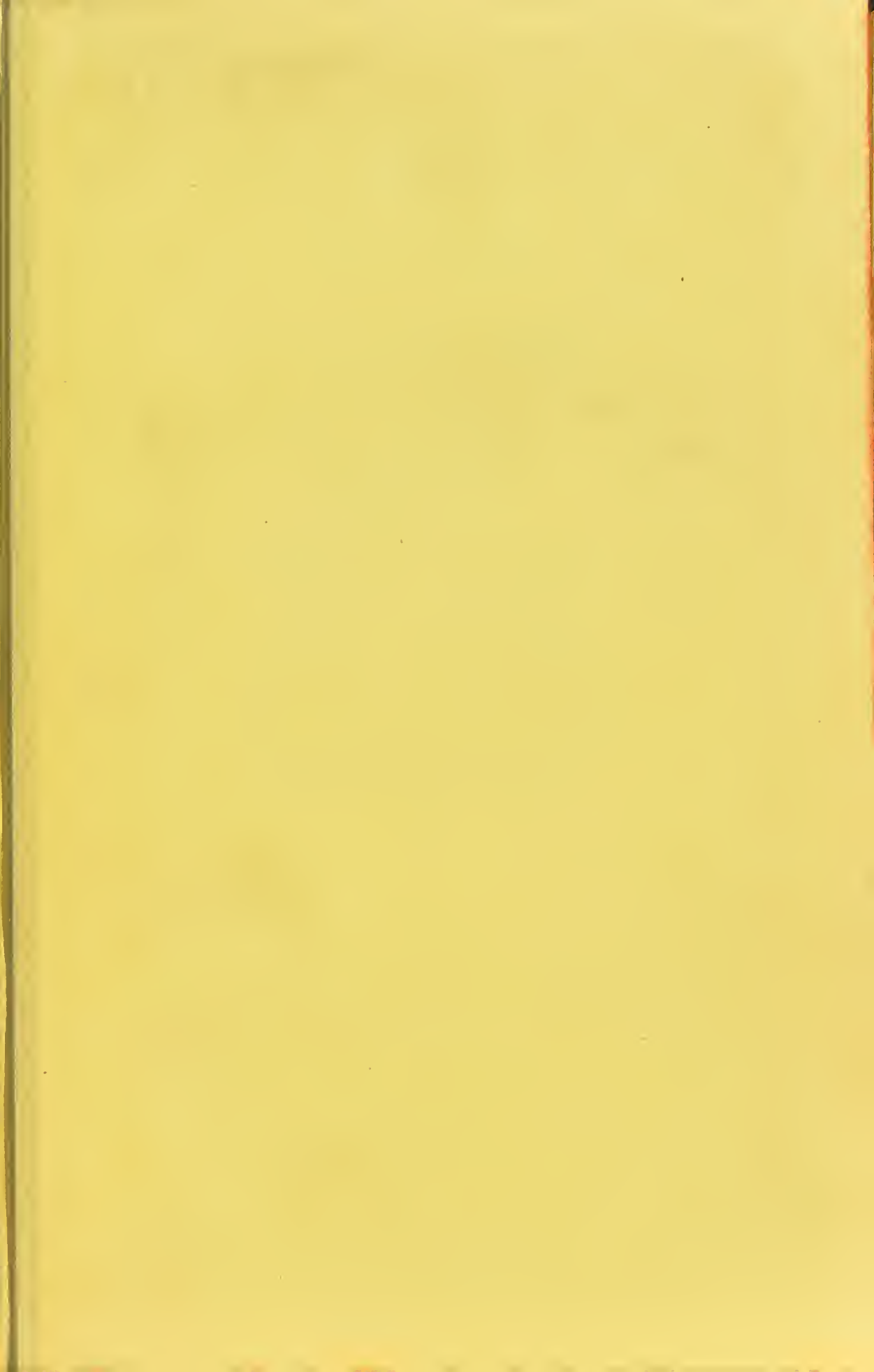


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- TULLOCH, THE VERY REV. JOHN, D.D., Principal of St. Mary's College, Vice Chancellor of the University of St. Andrews.
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L A W S

OF THE

ST. ANDREWS MEDICAL GRADUATES' ASSOCIATION.

TITLE.

1.—The Association shall be called “THE ST. ANDREWS MEDICAL GRADUATES’ ASSOCIATION.”

OBJECTS.

2.—The objects of the Association shall be the advancement of the Science and Art of Medicine, and of General Science and Literature, the maintenance of the interests of the Medical Graduates of the University, and the cultivation of social intercourse and good fellowship.

CONSTITUTION.

3.—The Association shall consist of Members, Honorary Members, and Associates.

4.—All Medical Graduates of the University of St. Andrews shall be eligible as Members, if recommended by two Members of the Association.

5.—All Members of the General Council, all Professors, and all non-medical Graduates of the University of St. Andrews, shall be eligible as Honorary Members, as well as such other learned and scientific men as may be recommended by the Council.

6.—All legally qualified Medical Practitioners shall be eligible for admission as Associates.

7.—Members, Honorary Members, and Associates, shall be admitted only at the General Sessions of the Association. The election shall be by ballot, and no one shall be declared elected unless two-thirds of the Members present vote in his favour.

8.—A Member, Honorary Member, or Associate, may withdraw from the Association by paying such subscriptions as may be due from him, and signifying his intention in writing to the President.

9.—No Member, Honorary Member, or Associate, shall be removed from the Association except in accordance with the following regulations. A

written notice of the proposed removal, signed by two Members of the Association, shall be sent to the Honorary Secretary, who shall immediately forward a copy of the charge to the Member accused, and shall at the same time summon the Council to meet within twenty-one days. He shall send a notice of the subject to be discussed to each Member of the Council at least fourteen days before the date of such meeting. If the Council shall resolve, by a majority of those present, that the Member so accused ought to be expelled, a notice shall be forthwith sent to each Member of the Association, making the next General Session special for the consideration of such removal, and if two-thirds of the Members voting shall be of opinion that the Member in question shall be expelled, the President shall direct the Honorary Secretary to remove his name from the list of Members. The votes shall be taken by ballot.

10.—The subscription constituting a Member or Associate shall be Five Shillings annually, due on the first of January in each year.

EXECUTIVE.

11.—The Officers of the Association shall be elected from the Members, and shall consist of a President, Six Vice-Presidents, a President of Council, a Treasurer, a Secretary, and a Council of Thirty-two; in whom the power of framing bye-laws, and of directing the affairs of the Association, shall be vested.

12.—Five Members of the Council shall form a quorum.

13.—The Officers of the Association shall be elected by ballot at each Anniversary Session of the Association.

14.—The Officers of the Association shall be eligible for re-election, except that two of the Vice-Presidents and eight of the Council shall retire every year.

15.—The business of the President shall be to preside at the Sessions of the Association; in his absence one of the Vice-Presidents, the President of Council, or the Treasurer, or any Member of the Council chosen by the Members present, shall take the chair. At the Meetings of the Council, the President of Council shall preside, and in his absence one of the Vice-Presidents, the Treasurer, or a Member of Council elected by the Council for that purpose.

16.—The Treasurer, or some person appointed by him, shall receive all moneys due to the Association.

17.—The money in the hands of the Treasurer, which shall not be immediately required for the uses of the Association, shall be vested in such speedily available securities as shall be approved of by the Council.

18.—The Council shall lay before the Members, at each Anniversary Session, a report of their proceedings during the past year, and also an account of the receipts and expenditure of the Association.

19.—The Council shall meet at least once in two months, unless by special resolution to the contrary.

20.—The annual accounts of the receipts and expenditure of the Association shall be audited by a Committee of three Members selected at the preceding Anniversary Session from among the Members at large.

21.—The Secretary shall have the management of the general correspondence of the Association, and of such other business as may arise in carrying out its objects.

SESSIONS.

22.—The Association shall hold an Anniversary Session, commencing on St. Andrew's day, or on such other day as the Council may determine. The place of such Session, its duration, and the business to be transacted, shall be arranged by the Council.

23.—The Members and their friends shall hold an Anniversary Dinner on the last day of each Anniversary Session, at such place and time as the Council may determine; the President for the year shall be in the chair.

24.—No alteration in the Laws of the Association shall be made, except at a General Session. Notice of the alteration to be proposed must also have been laid before the Council at least a month previously.

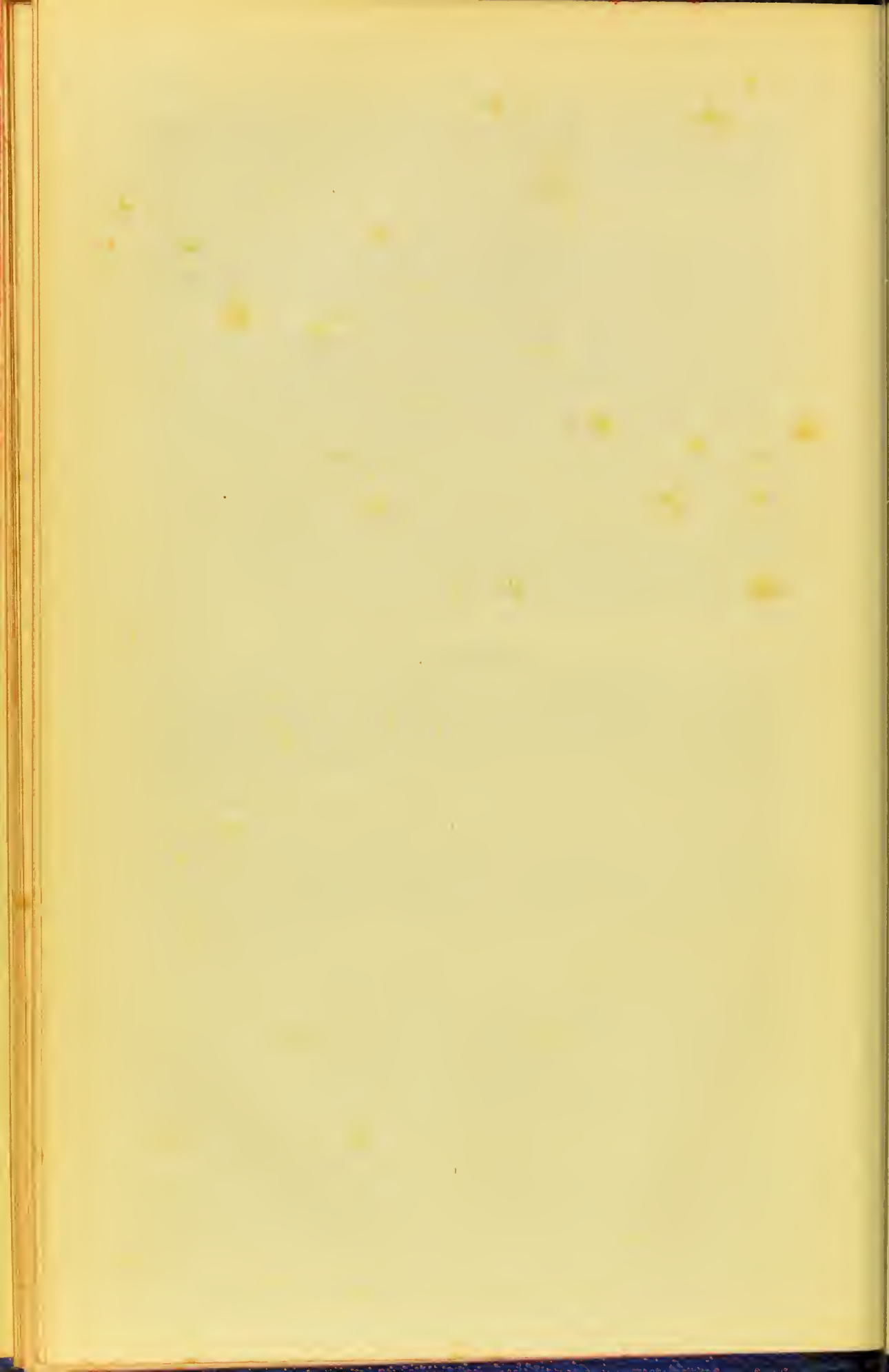
25.—The Council shall have power to call a General Session of the Members at any time, and shall also be required to do so within one month, upon receiving a requisition in writing to that effect from not less than twenty Members of the Association.

26.—All Special General Sessions of the Association shall be held at such place as the Council may appoint.

GENERAL.

27.—The Council shall have power to publish the proceedings of the Association, and to make such charge for them as they may deem right.

28.—The Council shall have power to order the name of any Member whose subscription is two years in arrear to be removed from the list of Members.



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ILLUSTRATIONS.

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President of Council, Assessor of the General Council in the University
Court of St. Andrews.

PLATE	I.	{	Fig. 1.—Dr. Balfour's Case of Spontaneous Cure of
			Aortic Aneurism.
			„ 2.—Dr. Gillespie's Case of Spontaneous Cure of
			Aortic Aneurism.
„	II.	—	Rupture of the Bladder.
„	III.	{	To Illustrate Professor Norris's Paper on Extrusion of the
„	IV.		
„	V.		
„	VI.		
„	VII.		
„	VIII.		
„	IX.	{	Morphological Elements of the Blood.
„	X.		

Transactions of the
St. Andrews Medical Graduates'
Association.
1870.

1870.

GENERAL SESSION,

WINDSOR, JULY 7.

ANNIVERSARY SESSION

LONDON, DECEMBER 2 AND 3.

GENERAL SESSION.

JULY 7, 1870.

THE Session was held at the Castle Hotel, Windsor, on Thursday, July 7th, 1870.

The President took the chair.

The minutes of the last Session were read and confirmed.

Dr. Arminson, Preston; Dr. Bacon, Fulbourne; Dr. Tripe, Hackney; Dr. Braithwaite, Leeds; Dr. Young, Leeds; Dr. Walker, Hanley; Dr. Suckling, Birmingham; Dr. Tenison, Shepherd's Bush; Dr. Hibberd, Harrow Road; Dr. Reeves, Carlisle; Dr. King, Rochford; and Dr. Hunt, Hoxton, were elected Members of the Association.

Dr. Lyall, R.N., was elected an Associate.

Dr. Alexander Strachan, New York, was elected an Honorary Member.

Dr. Part of London proposed, and Dr. Day Goss of Kennington seconded,—

“That the President be requested to address the Duke of Argyll, Chancellor of the University of St. Andrews, if necessary, in support of the resolution of the University Court concerning the regulations for the degree of Doctor of Medicine.”

Carried unanimously.

The Members and their friends visited, under the kind guidance of Dr. Oppert, the sub-librarian at Windsor, and Mr. Alfred Nutt, the different objects of interest in Windsor Castle. They then went to Eton, where they were received by the Provost, Dr. Goodford, who conducted them through the Library, and showed them the many valuable and interesting documents and charters deposited there. The Members of the Association were deeply indebted to the courtesy and kindness of the Provost for a most agreeable visit.

In the evening the Members and their friends dined at the Castle Hotel, Windsor.

ANNIVERSARY SESSION.

DECEMBER 2 AND 3, 1870.

The Fourth Anniversary Session of the Association was held at the Freemasons' Tavern, Great Queen Street, London, on Friday and Saturday, December 2nd and 3rd, 1870.

DECEMBER 2.

The Session commenced at 7 p.m.

The President took the chair.

The minutes of the previous Session were read and confirmed.

Dr. Bower, Windsor ; Dr. Purefoy Colles, Calcutta ; Dr. Goddard Rogers, London ; and Dr. Swete, Weston-super-Mare, were elected Members of the Association.

Mr. Harris, Redruth ; Mr. William Harris, Redruth ; Mr. B. Lowne, London ; and Mr. G. C. Coles, London, were elected Associates.

Mr. James Menzies, M.A. St. And., London ; Rev. R. H. Baynes, Vicar of Coventry ; and Professor Baynes, St. Andrews, were elected Honorary Members.

The Officers and Council for 1871 were elected.

Dr. Samuel Hill, Dr. Humby, and Dr. Painter were elected Auditors for 1871.

Dr. Ross of London proposed, and Dr. Swete seconded,—

“That the Council be requested to consider the preparation of a law to provide for the suspension of an existing law, should two-thirds of those present vote for such suspension.”

Carried unanimously.

The Report of the Treasurer was read.

The Report of the Council was read and received.

Dr. Richardson assured the Association of the great pleasure which he had experienced from their appreciation of his efforts,

and of his wish to continue to exert himself to the utmost to further the interests of his brother Graduates.

Dr. Seaton of Sunbury proposed, and Dr. Tripe of Hackney seconded,—

“That the Council be requested to reconsider the question of Criminal Insanity, with a view to the amendment of the laws of the country on that subject.”

Carried unanimously.

It was unanimously resolved that the following Alterations of Laws, recommended by the Council, be adopted:—

Law 11. After the words “Vice-Presidents” insert the words “a President of Council.”

Law 15. Omit the words “and at the meetings of the Council.” After the words “Vice-Presidents” insert the words “the President of Council.” After the words “take the chair” insert the words “at the meetings of the Council the President of Council shall preside, and in his absence one of the Vice-Presidents, the Treasurer, or a Member of Council elected by the Council for that purpose.”

Dr. Whitmore read a paper, “On the influence of recent Sanitary Legislation on the Health of the Metropolis, and on our present urgent sanitary needs.”

The President, Dr. Ballard, Dr. Swete, Mr. Lord, Dr. Tripe, Dr. Crisp, Dr. Wynn Williams, Dr. Ross, and Dr. Bloxam took part in the discussion.

Dr. O'Connor of London proposed, and Dr. Crisp of Chelsea seconded,—

“That the best thanks of the Association are due to Dr. Richardson, for the very able manner in which he has fulfilled the duties of President for the last four years, and that it be referred to the Council to consider the best mode of recognising the eminent services which Dr. Richardson has rendered to the Association.”

Carried unanimously.

Dr. Richardson, F.R.S. of London proposed, and Dr. Day Goss of Kennington seconded, a vote of thanks to the Treasurer, Dr. Paul.

Carried unanimously.

Dr. Ballard proposed, and Dr. Paul seconded,—

“That the meeting expresses its warmest and most earnest thanks to the Honorary Secretary, Dr. Sedgwick, for the able and efficient manner in which he has carried out the duties of his office during the past year; and that the President be asked to express to Dr. Sedgwick the regret of the Members at the cause of his unavoidable absence.”

Carried unanimously.

Dr. Bloxam very kindly undertook the duties of Secretary during the Session, Dr. Sedgwick being absent from illness.

The Session was then adjourned to the following day.

DECEMBER 3.

The President delivered the Anniversary Address, “For the Future of Physic.”

Mr. Gay, President of the Medical Society of London, proposed, and Dr. Day of Stafford seconded, a very cordial vote of thanks to Dr. Richardson for his eloquent and earnest address.

The President returned thanks.

The Session was then closed.

ANNIVERSARY DINNER.

The Anniversary Dinner was held in the evening of December 2nd. The President was in the chair. Dr. Lyon Playfair, M.P., C.B.; Mr. Prideaux, Q.C.; The President of the Medical Society of London, Mr. Gay; Mr. Hepworth Dixon; Mr. Frames; Mr. Marmaduke Bell; and Mr. Richardson, honoured the Association with their presence as Guests.

Admiral Sir E. Belcher, K.C.B., and Dr. Cooper Rose returned thanks for “The Army, Navy, and Volunteers.” Dr. Lyon Playfair, M.P., returned thanks for “The Houses of Parliament and our Member.” The President proposed “The University of St. Andrews.” Dr. Ross proposed “Literature,” Mr. Hepworth Dixon returned thanks, Mr. Hepworth Dixon proposed “The President,” who returned thanks. Dr. Bloxam proposed “The President Elect, Dr. Day of Stafford,” who returned thanks. Dr. Day proposed “The Vice-Presidents and Council,” to which Dr. Cholmeley and Dr. Wynn Williams replied. The President proposed “Dr. Seaton.” Dr. O'Connor proposed “The Press,” to which Mr. Kisley replied.

I.

BUSINESS OF THE ASSOCIATION
AND
COMMUNICATIONS IN CONNECTION
THEREWITH.

REPORT OF THE COUNCIL.

DECEMBER 2, 1870.

THE Council have the pleasure to submit to the Members an account of the work of the Association during the past year.

During the year sixteen Members, five Associates, and four Honorary Members have been elected, and seven Members have re-entered. Seventeen Members have resigned in consequence of leaving England, and from other causes. Four have died, and twenty-six have been removed for non-payment of subscription; one Associate has been removed for non-payment of subscription, and two Honorary Members have died.

The Association now numbers five hundred and five Members, twenty-six Associates, and forty Honorary Members.

The losses by death which it is the painful duty of the Council to report are those of Dr. Uvedale West of Alford, Dr. Adamson of St. Andrews, Dr. Eves of Cheltenham, and Dr. Armstrong of Armagh, Members of the Association; and Dr. Copland, F.R.S., of London, and Dr. Anderson of Glasgow, Honorary Members.

In order that the Transactions might continue to be published in a manner worthy of the Association, your Council found it necessary to make a slight increase in the price of the volume.

The proposed modifications of the regulations of the University of St. Andrews, which had received the sanction of the Association, were in due course brought before the University Court by the Assessor of the General Council, Dr. Richardson, F.R.S., and after having been submitted to, and approved by, the Senatus Academicus, were accepted by the University Court. These regulations have been sanctioned by the Chancellor of the University, His Grace the Duke of Argyll, and now only await the consent of the Queen in Council before they become valid.

Your Council, believing that the educational advantages of the

University of St. Andrews were very little known generally, have sanctioned the issue of a reprint of the article entitled, "Education and Graduation at the University of St. Andrews," in the Third Volume of the Transactions of the Association. They hope that this account of the opportunities offered by the University for a sound and extended education in all the subjects needed for Degrees in Arts and Theology will be a means of adding to the number of those who will avail themselves of its privileges; and that a consideration of the "Schemes of Study," which set forth a plan whereby the Degree of Master of Arts may be obtained, and at the same time one year of Medical study be counted, may induce many Members of the Association to give to those of their children who are to be of the new generation in Physic, the great preparation for their lifework which they would have made when, after a teaching as deep in its foundations as it is wide in its embrace, and an examination as searching in its mode as it is honest in its end, they had received from our ancient and learned University her testimony of their knowledge.

Your Council have again to ask you to consider the very important subject of the mode of taking medical testimony in the case of persons accused of crimes and supposed to be insane. This is, in truth, part only of a great question which is fast ripening for a satisfactory solution; the mode, namely, of taking medical evidence generally in Courts of Law. Your Council have to ask your permission to bring the views of the Association, as embodied in the "Memorandum on the Criminal Responsibility of the Insane," before the Government.

When the Medical Bill was introduced into the House of Lords during the last Session of Parliament, it was found to contain a clause empowering the Medical Authorities, of which the University of St. Andrews was one, to grant their lowest title or degree to such persons who, having passed the state examination and having obtained the state licence to practise, desired such title or degree, and that without requiring the applicant to pass any further examination. Your Council, after due consideration, passed unanimously the following resolution:—"That this Council is in favour of the proposed establishment of an examining Board in each division of the United Kingdom for the license to practise medicine and surgery. But it protests against the power given in Clause XX., by which Degrees may be granted by a University

“ without special examination.” This resolution was communicated to the Right Honourable Earl de Grey, Lord President of the Council, and in reply the following letter was received :—

“ Medical Department of the Privy Council Office,

“ May 10, 1870.

“ SIR,—In further reply to your letter to the Lord President of Her Majesty’s Privy Council of the 6th instant, communicating to his Lordship a resolution of the St. Andrews Medical Graduates’ Association, I am directed to express his Lordship’s satisfaction at the approval by the Association of the main feature of the Medical Bill now before Parliament, and to inform the Association, through you, that his Lordship intends to move, as an amendment to the Bill, the omission of University Degrees from the provisions of Clause 20.

“ I am, Sir, your obedient Servant,

“ JOHN SIMON.

“ L. W. Sedgwick, Esq., M.D.”

Your Council had very great pleasure in memorialising the Houses of Parliament in favour of Dr. Brady’s Bill for a means of providing a retiring allowance to Poor-Law Medical Officers ; and they have the satisfaction of informing you that already the Act has been put in force in several instances. This is another item in the debt which the members of the medical profession owe to their distinguished and philanthropic brother, the member for Leitrim.

The Rev. W. H. Seat has been in England soliciting contributions of books and scientific apparatus to Soule University, Texas. Your Council have had much pleasure in complying with his request for a copy of the several volumes of the Transactions of the Association.

Your Council are of opinion that the interests of the Association will be served by the establishment of a new office, President of the Council ; and proposals for such modifications of the laws as may be necessary for its institution will be submitted to you.

The termination of the occupancy of the President’s chair by Dr. Richardson, F.R.S., cannot pass unnoticed by your Council. His world-wide scientific fame, his energetic devotion to the reputation of the University of St. Andrews, and his watchful and ever ready

care of the interests of his brother Graduates have combined to render his four years tenure of office as honourable to the Association as it has been beneficial to the Doctors of Medicine of St. Andrews. The large number of the members of the Association, and the unity and good feeling which have ever characterised their Sessions; the successful fight for the University and the Parliamentary franchise, by which for the first time the Doctors of Medicine of St. Andrews became a real part of their University, powerful in its councils and jealous of its honour; and the abolition of that regulation, limiting the annual number of Medical Graduates to ten, by which St. Andrews was starved as it were to the very lowest point compatible with existence, and the re-opening, as far as the authorities can do it, of the University to all who are able to pass its fair and practical and searching examination;—these will ever remain proofs proclaiming the need of this Association, successes indicating the manner of its working, and memorials telling of the wise guidance of its first President.

THE PLEA OF INSANITY.

THE Council having in their Report desired the opinion of the General Session as to the advisability of approaching the Government for the purpose of bringing before them the views of the Association concerning the present state of the law in regard to the plea of insanity as expressed in the "Memorandum on the Criminal Responsibility of the Insane," printed in the Third Volume of the Transactions, the following resolution was unanimously agreed to:—

"That the Council be requested to reconsider the question of Criminal Insanity, with the view to the amendment of the laws of the country on that subject."

Dr. SEATON, in moving the resolution, pointed out especially the absurdity, as well as the great injustice to the alleged criminal, of the question of sanity being tried by a jury who, even supposing them to be qualified by education and mental capacity for such an investigation, were placed in circumstances which rendered it impossible for them to exercise a calm and unbiassed judgment; for, whilst the question of sanity was generally the *only one to be tried*, (the facts of the crime not being in dispute,) they were called upon to decide after their feelings had been wrought to the highest pitch by the terrible details of some sad tragedy; the effect of those details probably heightened by the fervid eloquence of the prosecuting counsel. Whilst, on the contrary, if the property instead of the life of the individual were in peril, the question would be submitted to the consideration of a jury of magistrates, merchants, and gentlemen—men of liberal education—and they would pursue the investigation under circumstances calculated to ensure the most perfect calmness and impartiality. Dr. Seaton, whilst admitting the abstract correctness of the dictum of the judges, that if the individual knew the difference between right and wrong he must be held to be a responsible being, pointed out the utter fallacy of

the tests usually relied upon for proving that knowledge of right and wrong ; those tests might perhaps satisfactorily show that the man knew that he was doing an act *which other people considered wrong*, but it by no means followed that he knew that he was doing a wrong act. Dr. Seaton considered that the question of the sanity of an alleged criminal should always be dealt with as an independent issue, and by a tribunal composed of men specially qualified for such enquiries.

Dr. TRIPE.—I have much pleasure in seconding Dr. Seaton's proposal, as I think there can be but little doubt that an ordinary jury is not a fit or proper tribunal for the trial of such a difficult issue as that of lunacy. Any attentive reader of trials in which this issue is raised, must come to the conclusion that the present system causes much injustice ; sometimes in consequence of the jury returning a verdict of insanity when the defendant or prisoner is not insane ; but far more frequently by their deciding against the plea of insanity, when any medical man would have come to an opposite conclusion. I trust, therefore, that the Council will give this matter their most serious consideration.

II.

COMMUNICATIONS ON MEDICAL AND
SCIENTIFIC SUBJECTS.

FOR THE FUTURE OF PHYSIC.

BY BENJAMIN W. RICHARDSON, M.D., F.R.S.,

PRESIDENT.

FELLOW GRADUATES.

Indulging one day in a luxurious day dream by the sea side, during the late autumn, it came to me that it would be a pleasing and a useful task to devote occasional hours to the construction of a history of the science of medicine of the Victorian era. It might, it seemed to me, be good, in this labour, to write of the men who, moving actively amongst us at home and abroad, were worthy the pen of the honest historian. It might, it seemed to me, be well to narrate the natural history of the diseases we see now around us in our daily tasks, that they who come after us may know with what we had to contend, and may compare our present practice with their own. It might, it seemed to me, be well to describe the means we have of curing disease, the extensions, the limitations of our science and our art, that they who are to come may measure faithfully the course and progress of curative art, from this epoch, to theirs. So vividly did the scope and character of this work appear before me in the vision of the day of which I have spoken, that even to minuteness of its detail the plan was fixed in the mind; and since then I have found the labour of carrying it out a natural and agreeable pursuit, the which, if I live to accomplish it, will perchance yield a work likely to live long when I am dead.

As I have thus been writing of the past and present, a vista has often opened of the future, of medicine; of the courses which medical science will take under the influence of changes of thought respecting the physical forces of the universe; of the new bases of the science, and of the perfections that will spring up on them; of the greater knowledge of life and functions of life; of the more certain modes of preventing and of curing disease. Thereupon I have been led to ask what can we, who now exist, do for the future? What are we doing for it? Are we doing the best we

can for it, or can we amend? In these contemplations I have found and founded the subject of the present discourse: and as this is the last discourse I shall have to deliver to you, as your President, the subject is in unison with the occasion on which it is pronounced.

THE PRESENT.

At first sight, the position of the present, from which we start, is neither assuring nor promising. A severe critic, with no intention of untruth, might say of us, that we live and breathe on uncertainty; that socially we appear to dabble with questions of legislation, without either teaching or influencing the legislator; that we appear to trust to Government protection for the right to apply our skill, and, instead of aiming to cast away the oppressive shield it loans to us at bitter interest, are ever wailing for the shield to be made stronger and heavier; that we appear to rise to practice on the paper wings of advertized emptiness, filling the sheet not with painful touch of scientific industry and unsparing fact, but with the egotism of belief that each of us has done what others have not done, and cannot do, though they religiously strive to follow our lead; that scientifically we appear incoherent and chaotic, and like all chaoses jarring, without reason, over proud of what we really do, blind to the thousand failures in what we attempt to do, and deaf to the demand that we must do more or be trusted less.

But when our present position is surveyed fairly, it is not so severely bad, perhaps, as it seems; the fact being that our life is of the day-book rather than of the ledger, containing many accounts which when they are posted up are truly worthless enough, but yet containing a result anything but contemptible for one age to present to the ages to come. Be it my duty herefrom to indicate a leaf or two that may be torn out wisely; a leaf or two that may be revised wisely; a leaf or two that may be elaborated wisely,—before our book passes into that unknown, when it is ours no longer either to cast up, tear up, revise, or preserve.

LEAVES POLITICAL AND ROTTEN.

If we begin with what may be torn up, we discover first a heap of mouldy leaves, supposed to contain some hidden virtue for making us powerful and respectable, but chiefly powerful in the world. They are docketed as papers between the Profession and

the State, and they consist of some great number of imbecile Acts of Parliament, each one opening with the declaration that it shuts up the last, and proceeding to prove incontrovertibly that it does no such thing. As far as I can divine, these papers have cost us more trouble, more money, more worry, during the present century, than all our scientific and practical work since we became a profession. For the purpose of cultivating these leaves, or for preparing the soil for them, great voluntary organizations have been instituted during the era, which bodies, in one way or another, in eating, drinking, travelling, speaking, organizing, disorganizing, quarrelling, fraternizing, writing, advertising, and printing, have, within Her Majesty's reign, disgorged themselves of not less than one quarter of a million of Her Majesty's portraits in sovereign gold. While another legal organization, more compact, much more practical, for itself, and much more determinate, has skilfully extracted by and for these same leaves some tens of thousands more.

As to the leaves themselves they have simply taken from us that patience of steady endeavour which trusts for the development of the most natural of sciences on the pure development of natural knowledge. They have produced amongst us separation of interests and galling unbrotherly bonds; they have drawn our men of genius for natural research, from the noblest to the commonest work. They have made us meanly powerless in the State, leading us to tell that august phantasmagoria, as it dissolves before us from time to time, and comes out again in new figures and colours, that were it not for its influence in our behalf we were at the top of the Fools' Calendar: we who hold the issues of life and death daily in our hands; we on whose looks broken-hearted men and women list for hope; we who have for our field of thought, not the State, but those human soul-parts that make the State,—the very primitives, the brain, the muscle, the bone, the sinew, the heart, of the Statesman! We fools but for the State! 'Tis a joke: yet no joke while there remains to insult us the mass we see, of Statesman's acts thrown off by him when he is worn out with other work and is empty as a drum, because, poor man, he cannot evade our importunate demands, but must give us something, though it be dry bones the dogs might reject.

In suggesting as I have suggested, the complete isolation of medicine from the trammels of bad legislation, I refer to the separation of the science only. Of those relations which co-exist between the State

as the employer, and the professional employed, I do not say a word. For special services rendered a claim is demanded that shall be worthy of the labour and skill of the servant, and here such simple and proper understandings should naturally exist between the State and the medical man as exist between the private individual and the medical attendant. We need tear up no such compact. The leaves to be destroyed are exclusively those that make the State a false protection between ourselves and the people; that keep up perpetual fermentation for what is called new medical reform; that entice us from our pure and single work of healing the sick, to distrusts and contentions within our ranks; that lead to the existence, and sustain the existence, of rival Boards having rival powers and privileges; that induce us to make endless, wearing, and useless efforts to put down quacks and schismatics by power of law, as against power of knowledge; and that foster a stubborn belief in our security, as a class, which crumbles to the dust whenever it comes in contact with the stern realities of life, with the sympathies, the fears, the superstitions, the prejudices, that make up the soul of human kind.

For the future of physic, our power must be based upon our knowledge of physic; and when we have a statesman born to us, we must make him a statesman of the State, and not a statecraftsman of our particular craft. In this way we may bring out real statesmen, for our early studies supply us with a reading of various truths from nature, which other men less specially trained do not possess, and these advantages fairly utilized, statesmen may rise from our ranks to be ministers even of the Crown, and to do us lasting honour. Of all professions and liberal callings ours indeed is the only one that has failed to produce a State minister. What a criticism on our statecraft! It is so because such of our body as have had the qualities and opportunities of statesmen have trickled away in the miserable gutter of medical legislation, instead of plunging into the great politics of the nation, and studying the national in preference to the professional welfare.

In the future we shall, I predict, produce great statesmen. We had at one time, and for many years, a man who was naturally strong as Bismarck, clear-sighted and light-hearted as Palmerston, eloquent as Peel, industrious and bold as Cavour, and who, but for the professional trammels by which he was held down, and the almost mortal professional fights in which he was engaged, might have rivalled any of those ministers in fame: a man whose life

I will depict in my history, be it only to show what human strength can do, and what ill-judged professional restraint can keep undone. Men of this same stamp will surely come again, and we of science should welcome them, encourage them, and, asking of them no special favour, bid them on their way, fearing nothing so deadly as their prejudices and undue loves for what was first written on their too receptive and open brain. Could we send to Parliament twenty men bound to our special interests, we were less powerful in the nation than if we were represented by one man, who, born for us, not made, should hold us with him as companions and friends whilst he achieved his own greatness and worked out his own natural and national career. I appeal to you,—Is not this simple, as it is solemn, truth? And is it not equally the truth, that if the hundreds of thousands of pounds spent, during the Victorian era, in weak, mischievous, medical, monkey-politics, had been expended on medical science, the Victorian era of medicine had been now infinitely grander, the world happier, and we nobler?

The representative of physic we really want, once called for, would unquestionably soon be found taking his place in the ranks of the political army of the State, and becoming commander there. The political, however, is but an accidental source of our power; the real source lies in the steady improvement, development, and simplification of medicine as a science and an art. The man who by his labours makes the smallest improvement in these directions is the true man who reforms and advances the body of physic; while he who stands foremost in these works is the very foundation of the art and of the science. —A William Harvey—he, whose figure, from the hands of our distinguished English sculptor, Durham, this year adorns the capitol of science of the capital of the nation—reforms medicine more than all the medical political preachers that have lived. One such as Harvey simplifies, consolidates, and sheds a golden splendour that pours into the eye from age to age, like the light of a sun that cannot be hidden. The sheet of lead in which such an one lies, in the dark vault in Essex some of us have visited, is more sacred than an Egyptian pyramid of medical politicians.

I was about to say, a few moments ago, that for the future of medicine we require to inaugurate a new era of thought and action. The mention of Harvey corrects, or rather checks, this idea. It is better to say we need to go back to our masters, and do as they did. We now wallow in knowledge; we need only

to clothe ourselves in it, as the masters did, and to show that we can wear it with respectable and dignified carriage. We want the knowledge simplified in all corners of it, but in some most; and this leads me to those leaves of our day-book that require, not excision, but revision.

REVISION OF MEDICAL NOMENCLATURE.

To begin here with simple things, the first act required for the future of physic is, the simplification of the language in which we professionally communicate with ourselves and with the world. We complain often that the world is ignorant because it does not comprehend our learned speech. The wonder truly is how the world tolerates us at all in this respect, or gives us patient hearing; and there is a greater wonder still, how we ourselves manage to master the terms we use so glibly. Certainly we are forced to devote more brain-work for the acquisition of mere useless terms than of all the practical facts we know and can put together. We turn to our nosologies, and find there are five hundred terms, each several ways modified, for less than half that number of diseases, and what is worse we consider it wholesome to continue adding to the list; the primary false step being this, that we lift up phenomena, or symptoms of disease, into essences of disease, and having theorized that the phenomena mean distinct maladies, try to invent as many causes as there are phenomena, taking up the causes as so many secondary considerations. We turn to our physiology to discover the same error; phenomena classified in hideous mysticism of expression, with increasing mysticism day by day; negatives turned into affirmatives, and the reverse, to suit the pleasure of the mystifier. We turn to anatomy, and if we be of simple mind we conceive that in the description of the mechanical parts of an organism, whether it be animate or inanimate, there should be no difficulty. Puerile delusion! The language of descriptive anatomy is simply barbarous; one structure or part is named after a man, another after a part of a man, another after a beast, another after a fruit, another after a function, another after a shape, another after a quality, another after an objective thing, a boat, a stirrup, a lyre, a bridge, a pen, a hammer, an anvil, a road, an aqueduct, a canal, a drum, a bed, a sieve, a saddle, a ditch, a hole, a mountain, a vestibule, a labyrinth, a staircase, a mitre, a sheath, and so on. We stagger under the weight of such useless remembrances, in which there

is no method, and as a rule no correctness, even in simile. We turn to pathology, by comparison a modern study, to find, alas! no better language. And at last we turn to chemistry, as the most fixed of our studies, and lo! except that there is now some method in its madness, the language of chemistry is the maddest of all.

For the future of medicine it seems to me, as my own wearied mind recalls how much I have been forced uselessly to learn and relearn, that we want a complete revision of our nomenclature in every department, and that any man, or any society of men, or any council of many societies, that should set itself to work, in ever so small a way, to bring into use a simple and reasonable scientific language, would do the most important service in physic that ever fell to the lot of man to perform. A manual of anatomy compiled on reformation of language would be the best beginning, and would soon lead to continuance of reform in physiology, nosology, chemistry, and all the other allied branches of physic.

REVISION OF ENGLISH CRITICISM OF PHYSIC.

For the future of physic it is essential to revise our method of receiving and criticising what is brought to light as real or assumed novelty of knowledge. It is a marvel how physic is daily, and with infinite waste of labour, rewritten; it is still more of a marvel how what is written and rewritten is criticised. In our past history we were divided into three classes. We had a class of great and original workers, who, after much toil, dared to add something to the republics of science and literature. We had a few great critics, who, claiming for themselves no originality, were nevertheless very great and very powerful; they knew what was old and what was new; with unsparing, masterly, and unanswerable argument, they held up the old as the old, the new as the new, and the supposed new as the old in different attire,—and they made history. We had, lastly, the reading, observing, and learning masses, who, taking up the work the original thinkers brought forth, used it, and applied it, according to its worth. Now, all this is changed; now, the popularity of literary business, I cannot call it literary art, absorbs every man; and sedentary force, force developed in *situ*, is, as compared with force in *motu*, all pervading. In this day—our original workers let themselves down into letters; our practical workers lift themselves up into letters; and as to our great critics, of them it is

impossible to speak, for the simple reason that the whole family is dead, while criticisms have become mere impulses,—bastards of love and hate, boldness and fear, adulation and abjuration, industry and ignorance, flux of generosity and flux of selfish conceit.

These are evils, but they are minor evils compared with others. I believe, as a nation, we have a national fatuity for ignoring the history of our own country, and that we are the most unpatriotic historians on the face of the earth. Still, it would excite surprise if any city merchant were to write to "The Economist" to ask why England was the only country that could not produce a millionaire; or for a man of letters to write to "The Athenæum" to ask why England could not produce a poet; or for a man of law to ask why England could not produce a judge; or for a man of science to ask why England could not produce a mathematician or an astronomer. Well! but I took up a paper a few weeks since, and found a physician, a graduate of a leading University, actually asking the question:—Why England was the only nation that could not produce a physiologist? The fact is as incredible as it is fact. But think of the depth of darkness of learning in present medicine, when, on the very land where were discovered the physiological truths of the circulation of the blood, the process of respiration, the presence and uses of oxygen, the division of nerves into nerves of sense, common sensation, and motion, the division of roots of nerves into sensory and motory, the reflex function of nerves, the structure of bone, the transfusion of blood, the presence of fibrine as a separate part of blood, the fact that the poison of the viper is not poisonous when swallowed, the fact that if a main artery be tied the circulation will continue by the anastomosing vessels; and, not to name a hundred more things, the immortal discovery that narcotic gases may be inhaled to the annihilation of pain with continuance of life;—think, I repeat, of the depth of darkness of present medical learning when an English physician can ask,—Why England is the only country that cannot produce a physiologist? The question was lamentable! It was not more lamentable than the reply founded upon it. The reply was that England could not produce a physiologist because the State did not, as on the continent, support the study of physiology. As if, in a country where under perfect freedom the best of intellect must make free way, it were the duty of the State to select and lift up certain philosophers, and, assuming,

by some intuitive wisdom of its own, that these were the philosophers, make gods of them and slaves of all the rest.

Cognate with these topics is another, on which there must, in this country, be revision, if we of the country would have a future in medical science. This revision consists simply in assigning due credit to English labour. A distinguished German professor said to me some two years ago, with native candour, "You English writers would make Germans and Frenchmen very proud, by what you say of us and our works, to the exclusion of Englishmen, if the persistent and loud laudation would stand the test of history; for you seem to think that whereas nothing good can come out of England, everything good can come out of Germany and France. We," he continued, "who read little English, err on the other side—it is a very natural error—and think nothing is so good as our country's labour; but," he added, "flattering as your praise is to many of us, it is contemned by those of us who reflect, because it is simply untrue, and we dare not accept it. We see, in fact, in you an internal jealousy which persuades many of your writers to give us credit for doing original work, in order that it may not be conceded that the work done was done originally by your own countrymen, and was only followed by us." I believe no more faithful criticism was ever passed upon English medical science, but it was not more faithful than another remark by the same authority, to the effect that in our indiscriminate praise of continental research, because it is continental, we persistently speak of foreign writers as the lights of the world, who in their own sphere are unknown as being possessed of any light at all, while we ignore the real men who shed the light.

For the future of medicine these errors of the Victorian era must be reformed absolutely. Giving due and even handsome credit to all fellow workers wherever they may be, we must become, in England, just to ourselves, and must feel that we too have and sustain a mission of greatness. It is a sound maxim that the world thinks of us not as we really are, but as we present ourselves before it. It is an equally sound maxim for each of us to hold a just and conscious pride of everything we do that is useful, and to retain, each in his own heart of hearts, the lesson brave old Sir Humphrey Gilbert taught us:—"Give me leave therefore without offence always to live and die in this mind; that he is not worthy to live at all who for shame shunneth his country's glory or his own honour."

REVISION OF MEDICAL EDUCATION.

For the future of physic it is an essential that some revision be made in the system of training our sons for the work of our professional life. I shall touch on this subject very briefly, because the reforms suggested as necessary, and which even ten years ago were treated as visionary and revolutionary, are now all but unanimously conceded as the right and proper and requisite reforms to be promptly carried out. They are revisions founded on observation of the past, and on natural observation, and are precisely such as any man with his face turned backward on history would be sure to offer, and, as Schlegel would say, prophecy upon. They rest on these truths, that, whereas from the revival of letters to the commencement of the present century, from Vesalius to the Brothers Hunter, medicine was never without at least one great and exalted genius for professorial work, she has now not one, because the art of the teacher has been allowed to fall into disrepute; that in a city even so large as London, there really is not scope for ninety professors of physic; that the plan of subdividing medical science into parts, for the mere sake of increasing the number of chairs, is a false and mischievous division; that charitable institutions called Hospitals ought to be schools within which practical study of disease should alone be conducted, and that they are supported by the public for the cure of disease, not as schools of chemistry, schools of anatomy, schools of physiology, schools of botany, and schools of every general science apart from practice; that every hospital physician and surgeon is not by instinct a teacher of science; that in London two great theoretical schools of medicine are sufficient, and that as chemistry would be better taught by a great teacher like Hoffman than by a dozen small teachers, so of the other theoretical branches of knowledge; and, that an astounding advance would soon be manifest were the present practitioners, who make teaching for an hour a day a drudgery of their existence, replaced by a few men who looked upon teaching as a noble pursuit, who devoted all their lives to its cultivation, and who, when they met their admiring classes, in academical dignity, felt they were carrying on a work which added to their fame, their competency, or, if the success of the teaching were great, even to wealth, as a reward for industry. In a sentence, the revisions suggested do but bring us back to the method of teaching, which history has declared to have been grand and successful, in place of a system which history

has proved to be both demoralizing and devitalizing;—demoralizing, as showing to the young how the most important duties may be slurred over by their guides; and devitalizing, as being bereft of enthusiasm, of hope, of promise; no finger of wise man pointing to wicker-gate and narrow road, with the inspiration “There is the road, it is hard, brave it; there is the gate, it is glory, win it.”

The visionary and revolutionary thoughts are now no longer anything of the kind, because, while they remain as heretofore, opinion respecting them has veered round to them. It is hopeful also that in this change of sentiment, many present occupiers of chairs join most heartily. There must soon therefore be change of action, and I leave the subject of this important revision with sincere satisfaction; with the prospect, clear in view, of two or three great central schools of physic in London, and one or two in the provinces; with the prospect of professors vying with each other in celebrity, and living by their work; and with the further prospect of students from the remotest parts of the earth trooping to our Asclepian temples, where the light always burns and with increasing lustre.

REVISION AND EXTENSION OF METHOD IN MEDICAL OBSERVATION.—THE BLOOD.

For the future of physic, it is essential that we should revise method of observation not less than method of expression of observation. It is not that we need new inventions of research, but that we require to exchange some favourite methods, well-nigh worn out—and, honestly speaking, not very useful, except as floating capital—for some other methods not worn out, and asking to be turned into capital promptly. I will take in illustration one or two of the most pressing subjects of this kind.

The immensity of the discovery of the circulation of the blood so deeply influenced medical men, that, for over two centuries, all dynamical acts of the living body have been included in the study of the circulation, while, to create newness, many ideas have been connected with the discovery year by year, some of which are good, others, at the most, a mere part of the thing itself, or perhaps no part of it, but an imagining upon it. The blood flows from the heart by an artery into the body, the blood flows through capillaries into a vein, the blood flows back by a vein to the heart; the blood is red, the blood is dark; the blood is vitalizing, the blood is poisonous; the blood takes heat, the blood gives up heat; the blood

absorbs gases, the blood gives off gases; the blood is liquid flesh, the flesh is solid blood; the blood bleeds, the blood stops bleeding; the blood is a fluid, the blood is a solidifying liquid; the blood turns all animal parts into itself, the blood yields all animal parts out of itself; there is a healthy body, the blood therefore is healthy; there is a diseased body, the blood therefore is diseased; and so on.

There is in these forms of thought much simple truth, much error, much want of true appreciation; so that, on the whole, an instauration is demanded, founded on new physical truths. Thus the idea that arterial blood is a sustainer of life, and venous blood a destroyer, is an utter misconception, inasmuch as modern research tells us, not only that arterial blood is a sustainer up to a given point, and no further, but that arterial blood could not be produced unless venous blood were present to play its part in the process of supporting life. Again, the idea that the elaborate system of blood-vessels is laid down for the simple purpose of circulation is an error, or at least a shortcoming of truth. A river may be the mechanical means for bringing into a town on its banks, all the necessities of the town—the water, the food, the fuel, the clothing; and the same river may be the means of removing all the used up materials and débris from the town; and, compared with the two streams of the blood, it may be said to complete a circulation. But the problem of the service performed by the river is little enough after its circuit is discovered, until we know what takes place in the town, with the things brought into it, utilized, and sent out of it. The same in the body; it is poor work to know the circuit of the blood and not to know all that takes place out of the circuit, the transitions of substance in the provinces of the body through which the river flows. It is the fact, nevertheless, that up to this time we have made out little that is positive on this grand point; and here, consequently, is scope for work. Happily the method of new research is suggested to us in various ways, and in such ways that the research can be conducted accurately, even out of the body.

For example, the magnificent fact of dialysis, opened to us by the discoveries of our great physical master, Graham, is full of wonder for our indulgent. We know now that the body is divided into structures, that are either colloidal or crystalloidal. We know that colloidal substances take up water and hand it over to crystalloidal substances; and that the crystalloids fix the water and bear

it away. We know that the material construction of colloidal substances changes in character according to their relation to water and crystalloids. Thus the pure and exquisite colloidal globe, the crystalline lens, is a clear transparent solid, under the ordinary conditions of the living animal; but we let circulate through it by the blood a little excess of crystalloid, and that transparent province of the organism becomes a dense opaque cataract. We remove the crystalloid by admission of water, and behold! the colloidal matter clears again, and the cataract becomes once more the transparent refracting lens. We diffuse fluid colloidal fibrine through a crystalloidal solution, and it remains a fluid; we diffuse water through the solution until we have saturated the crystalloidal matter, and thereupon the fibrine solidifies, precisely as it solidifies in those active colloidal vital instruments which we denominate muscles. We know that, if we place a mixture of colloidal and crystalloidal substances upon a colloidal membrane floating on water, the colloidal substance in the solution will deposit on the membrane, while the crystalloidal substance in the solution will pass through into the water. We know that, if we pass a crystalloidal fluid through a colloidal tube surrounded by water, the saline solution will pick up the water in current and bear it away. And lastly, we know that, if we place a colloidal and crystalloidal mixture in a membranous tube, the outer part of which is exposed to the air or to open space, the membranous tube, if there be no excess of crystalloid in the solution, will take up a certain portion of the water, and, at a temperature not higher than the temperature of the living animal, will give up the water to the open space by transpiration, or, in other words, by evaporation.

Well, we turn with this knowledge to the construction of what I have called the provinces of the body, and lo! there is in every part a great system of plans for this simple process of dialysis. There are the colloidal dialysing membranes everywhere; there are the membranous tubes for conveying the compound of colloidal and crystalloidal matter which we denominate the blood; and there are the open colloidal transpiring surfaces which we call skin and mucous membrane. What a field of knowledge is here opened to our view!

THE TWO NERVOUS SYSTEMS.

For the future of medicine, an improved field of research is de-

manded in relation to the functions of the nervous systems. From the time when our master, Thomas Willis, whom Rochester's mutton-eating king destroyed by a senseless jest,—a king's word, however foolish, being then indeed a vengeance,—from the time when Willis first carefully dissected and described the brain of man, and wrote for us that wonderful but little-known volume, “*De Anima Brutorum*,” until now, there has been persistent study on the nervous functions. This might be expected, for around the study there is, if I may use the expression, a sublime romance which holds in entrancement the fervid mind. The worst of the study is, that, while tens of masters have followed it, hundreds of slaves have fooled with it, as if it were something to be even connected, through weakness, with labours the masters have considered matchless in promise of result. In consequence, many major facts made out in relation to the nervous system have been buried amongst rubbish of speculation, while steady research towards certain definite objects has been replaced by indefinite and meaningless hypotheses. We want, then, to call back upon the few greater studies, and recognize them. So many examples here occur to the mind, it is hard to select; but I will venture on one or two selections.

The fact that there are two distinct nervous systems in the living body, though it is drilled into us by the anatomists from our earliest connection with medicine, is not, I am sure, in a sufficient degree appreciated by the majority of practitioners anywhere.

The metaphysicians, who have known little of the physics of the nervous system, have indeed, by their outward classification of the phenomena of nervous action, done far more than we have in recognizing the two intelligent natures of man,—the instinctive animal, or even perhaps, as Locke himself would now have allowed, the innate nature; and, the learning, acquiring, intellectual nature. Or, to define them differently, the nature that proceeds from the man outwards into the universe; and the nature which, as if in exchange, proceeds from the universe into the man. But the majority of us, behind the metaphysicians, have yet to learn what the illustrious Bichat so clearly demonstrated to us as physicians—that as there are truly two intelligent natures, so there are two distinct seats for these in nervous structure; that the chain of the great organic nervous system is the centre of all the instinctive acts, of all emotions; and that the cerebrum, cerebellum, and spinal cord, are the centres of all the controlling intellectual

volitional powers,—the centres governing the instinctive processes themselves, so that a man may not die by laughter nor tears, by passion nor envy, by rash fear nor rash boldness nor rash desire. So that a man may live, having the deepest, the profoundest loving sympathies, the wildest humour; and at the same time may have in him the intensest—I had almost said the savagest—of passions; all of which are good or evil, as he shall be able to rein them in by his higher volitional reasoning powers, the seats of which are the cerebrum, cerebellum, and cord.

Learning on this subject has yet to be acquired fully by our profession, and not by ours only, but by that profession which is so kindred it seems to be an actual part of ours, and which Shakespeare separates only by a trembling film when he advises, respecting a patient whom he makes up for us himself:

“More needs she the divine than the physician.”

It is true that now and then a pencil of light on this subject has appeared amongst us, and I name the fact with sincere pleasure, because from one of our own associates, Dr. Davey of Northwoods, the light has proceeded most intensely of late years. It is a light that is seen to glow when it is looked at, and it illumines our practice in every case of disease we have to encounter. Let me know the balance of the two natures of a man, and my estimate of the value of his life, of the course of his disease, be he the victim of disease, of the character of suitable remedies, and of the efficacy of remedies, are all influenced by the knowledge. Where the sympathetic nature is strong and vehemently active, a word may cure or kill; where the volitional nature, cold, calculating, resolute, is predominant, the most potent drug will be half neutralized. The drachm of chloroform that shall narcotize an artist, a musician, an actor, shall not make a calculating, precise athlete so much as laugh, nor ten drachms make him sleep.

PHYSICAL STUDY OF EMOTIONAL PHENOMENA.

For the future of physic, further advance is demanded on the subject of the governing power of the sympathetic or organic nervous supply over the blood-vessels. That the section of the sympathetic trunks leading to an organ or part, causes paralysis of the vessels of the part, so that they fill with blood, and for a time give off excess of heat, is now distinctly proven. To this is more recently added a truth equally striking, that one chemical agent at least, I mean the sweet, fruity-smelling fluid called the nitrite of amyl,

when it is introduced into the body, produces the same kind of paralysis; so that we can by its means charge the blood-vessels with blood to such intensity of fulness, and so easily, that a little of the vapour diffused in this room would quicken the motion of every heart, and flush every cheek with crimson. And to this again is added still more recently another fact, that those unseen agencies which excite the emotional phenomena of blushing, palpitation of the heart, pallor, faintness, act in precisely the same physical manner, viz., by producing paralysis of the controlling sympathetic power.

Here then is opened to us, for contemplation, a psychical study from physical data. It is opened to us that emotional phenomena are the results of physical vibrations or shocks conveyed from the outer world through the senses to the organic nervous centres; that these centres lose, under the physical impression, their controlling power over the vessels under their charge, and that all the phases of an emotional phenomenon, from flushing to paleness, from paleness to pallor, from pallor to syncope, and from syncope to death, are but grades or gradations from one physical change to another, the whole resting on the primary shock conveyed to the organic nerves.

And yet another point in this advance deserves notice; it is, that the emotional effects produced by the chemical agent I have named, can, when they are not overpoweringly called forth, be opposed, to a certain extent, by the force of the will. Thus those persons who are by nature most easily influenced by what are called emotional causes, are those who are also most easily influenced by the agent; a chemical substance might, in fact, be employed as an actual physical test of the organic susceptibilities of different individuals.

The research in the new direction now described, once opened, the richness of the prospect is wonderful. From the one chemical agent we pass to others, asking each as we come to it, Do you exalt or depress the organic nervous power? The flushing, the excitement, the over-action of the heart from alcohol, how those phenomena unravel by this light! The reactionary flush and glow after exposure of the body to the paralysing influence of cold, how simple the explanation as we may read it now! The extension of the paralysing process from the organic centres to the centres of volition, and the lapse from excitement of emotion into insensibility, muscular prostration, and death, when the agency, be it psychical or

physical, is intense,—how simply the phenomena read in sequence, when the way is made clear to read them ! But I must dwell no longer on this absorbing theme.

MOLECULAR CHANGES IN NERVOUS STRUCTURE.

For the future of physic we require to revise our views respecting the molecular changes which occur in nervous matter. The discoveries, in electricity, of Galvani and Volta, and the experiments made by Aldini, the distinguished nephew of Galvani, at the commencement of this century, were sufficient to startle every mind, and to develop a new era of thought. In 1803, one John Forster, a malefactor, twenty-six years old, is hanged at Newgate on the 17th of January, a cold, frosty day. Malefactor swings in the cold air one hour, with the thermometer two degrees below freezing point. Then the body is conveyed to a house near, and in pursuance of sentence is delivered to the College of Surgeons. Master Keate, master of the College, (some of us remember Master Keate very well,) Carpue, Thomas Hood's own Carpue, Hutchins, one of Carpue's prosectors, Cuthbertson, the electrician, Blicke, an anatomist, Dr. Pearson, a physiologist, and, I believe, young Brodie,—are all at this house, together with Aldini. Aldini has a battery of forty cells in three troughs, and malefactor John Forster, cold, stiff, stark, is subjected to the influence of the battery. An arc is made from the ear to the lower part of the trunk, and as the electrical stream flows and penetrates into the life-suspended muscles, these muscles play again. John Forster grins horribly at his manipulators, as if they were hurting him ; he opens one eye, and fixes it on something ; he moves his limbs. They withdraw the electricity, and John Forster is quiet again ; they try if strong ammonia to his nostrils will influence him, and find it will not ; but they re-apply the electricity with the ammonia, and the effect is so extraordinary they think the wretch is actually alive again ; but they stop, and he stops. Then they open his chest and expose his heart, and find that no electrical current will restore its rhythm ; so it is clear that all through the experiment John Forster has not lived by his heart, and it is also clear that the muscles under the volition may be irritable, while the involuntary heart is quite dead.

The experiment, as well it might be, was the marvel of the world, and Aldini, who did not, he tells us, mean to bring the malefactor back to life, became the hero of the hour. He was presented, Master Keate made a good stride toward court eminence,

and altogether there was popular fame on the winds travelling briskly in 1803. As to the world of science, it was wild with commotion; a volcano bursting through a tranquil lake were not more grandly disturbing. Other experimentalists performed the same experiments on dead malefactors, and with like results; Galvani's theory of animal electricity recovered from the attacks of Volta; and by a vast leap of learned speculation, the human body was declared to be an electrical machine; of course, for the torpedo is such a machine, and there is proof direct. So at once the old researches, from the time of Sylvius, through Haller, Winslow, the Munroes, about the existence of a veritable nervous fluid, went to the wall without question, or were as ignored as if they had never been.

Galvani's and Aldini's experiments were astounding, and rightly read they retain, as do all carefully proven facts, a lasting value; but they led to more error than any of which I know. There is nothing in science of nonsense so gross, as the garner of nonsense that has been gathered, up to this very time, on the so-called animal electricity. Incoherency can go no further than it has gone in this direction, while science has not advanced a minute's march in seventy years toward even a preliminary demonstration of the existence within living bodies of a sign of an electrical mechanism, except in the rare cases of one or two specially constructed electrical animals.

Here then, I think, for the success of the future of medicine, we have to call back and revise. We want to know, even yet, whether there be a nervous fluid traversing the nervous cords, or circulating between the nerve centres and blood. And particularly we want to ascertain what is the molecular change of matter of the nervous system, when it sleeps or rests, when it wakes or moves. Light, I am glad to say, begins to break on this primary enquiry. We can make nervous substance temporarily solid by cold, *i.e.*, by crystallizing it, and then the nervous structure rests and sleeps. We have to see then, whether, when our eyes drop with natural sleep, this same change of structure is not progressing naturally in nervous structure; we have to ask whether under sudden shock—shock from a bullet, for instance—the complete destruction of nervous power is not due to some change of nervous matter under sudden vibration of its particles, like the change which occurs when water suddenly solidifies under motion, or when fluid fat by brisk agitation becomes a concrete mass.

MORBID IMPRESSIONS ON NERVOUS MATTER.

There is for the immediate future of physic another study; the study of directness of morbid impressions through the expanses of nerves, and of primary origin of disease by instant change of nervous physical state. The influence of the old humoral pathology hanging still about us, we are bound by its strong bonds to the blood as the fountain, not only of all health, but of all disease. Thus we talk of blood diseases as if we knew every fact about blood disease with a certainty of absolute knowledge. Candidly, however, what do we know about blood disease? We know of white cell blood; we know of chylous blood; we know of anæmic blood; we know of a blood with a deficiency of fibrine; we know of a blood with an excess of fibrine; we know of a blood modified by bilious matter; and, in some extreme forms of fever in a late stage, we know of a condition of extreme fluidity with disintegration of corpuscle of blood. All this is valuable knowledge; but what know we about direct morbid influences upon blood? We talk of zymosis, and speak of some diseases, which are assumed to be due to poisoning of the blood, as zymotic blood diseases; but respecting this zymosis or fermentation of blood, as a fact, we have not a shade of evidence. There may be fermentation in the blood, but if so, we do not yet know what parts undergo change, and we understand nothing whatever of the products of the fermentation, what they are, or where they go to. We say, in reference to poisons, that they enter the blood, and are conveyed by it to all parts of the body, so that the blood is the channel by and through which all poisons act. Is this true? It is not proved true; and modern evidence respecting the action of nitrite of amyl and hydrocyanic acid is to the direct proof that the blood channel is unnecessary; that immediate action on a nervous expanse, the olfactory for example, is an efficient influence, and that blood-changes and changes in circulation, though they are the first visible phenomena, are but secondary phenomena to the nervous shock. We see even that the organic nervous system itself may be immediately influenced through the senses, and that as one agent—a particle of musk for instance—can produce one distinct effect, an odour, so another agent—such as a volatile organic nitrite—can, through the same medium, produce another distinct effect. What then of the agents that cause our spreading diseases, in which the alarm is first rung on the sympathetic chain, in symptoms of nausea, vomiting, irregular tension of blood-vessel, and other proofs of disturbed balance of

power in the organic centres? In what does the crimson blush and injected throat of scarlet fever differ from the crimson blush excited by nitrite of amyl? Is it not that in scarlet fever the sympathetic is paralysed, and that the vessels it controls are no longer under steady rein; and are not the nervous derangements primary, the blood derangements secondary? I will not answer these questions in the affirmative, but I affirm confidently that until they are answered we can make no advance whatever in understanding the origins of pestilential diseases, their nature, or their scientific treatment; that until these questions are answered a class of diseases which should be the easiest of cure, and which sweep away our populations at the season of life when all is promise and hope, will continue to be the mocking witnesses of our inability to save even our own flesh and blood in the freshness of its youth and its beauty.

I have spoken of acute diseases: I would extend the argument to chronic diseases. We say cancer is a blood disease. Is it? There is no evidence of such thing; but there is much evidence that it is a primary nervous disease. We say of all hereditary diseases that they are blood diseases. Are they? There is no evidence that they are; but there is most telling evidence extant that hereditary proclivities of all kinds, mental and physical, have their bases, invariably, in the nervous system. The recent researches of Dr. Brown-Séquard, on the transmission of disease from generation of animal to generation, from a primary injury of nervous matter, call out to us to change our course of thought, with a force of silent eloquence words cannot possibly approach.

CURERS AND CURES.

The influence of race on vitality; the estimation of individual and national life-values on some more certain method than at the present time is known; the classification of diseases geographically and socially, on the plan now being carried out so ably by our associate, Mr. Haviland,—these enlarged studies for the immediate future of medicine I must pass by, that I may dwell for the remaining moments on one other particular section of the leaves of our book lying open for revision and elaboration; the section, I mean, that treats of cure.

Up to this time we have been divided into three camps of so-called Curers. There have been men so saturated of faith as to hold up the device Elixir Vitæ, and maintain the discovery of

the art of extending life to indefinite length. There have been those who, watching the uncertainties of cure, and perfectly innocent of faith of any kind, have laughed secretly at all attempts at cure, and have carried a banner white as their own vitals. While a major camp has continued to toil away, amid all difficulties, conscious of the extreme follies of their divided allies, conscious of the limitations of their own power, and yet not sorrowful like men without hope, but doing their best, and believing in the grandeur and ultimate success of their calling. With this last camp the future of physic, in its curative and practical life, must remain for perfect development. The ideal of a perpetual life, on a limited planetary surface, with an unlimited reproduction of life, is a physical absurdity, suggesting opposition, not to death alone, but to birth, and suggesting the re-editing of every human work except humanity. The ideal, on the other hand, of humanity charged and filled with soul, and advancing ever towards the high, the higher, the highest intelligence; the ideal of this humanity panting out its life in eternal sufferings and repulsive deaths, without helping itself to the *euthanasia* that has been so beneficently provided for it at the close of its natural cycle, is equally absurd physically, while it is infamous morally. They therefore of the major camp have before them the labour of cure, and this the grand scope of their task, that between the first natural appearance of the human living thing on this earth, to its last natural appearance, it shall not die from unnatural causes, nor from natural causes that come within the governance of man. Thus we—for I assume we are all of the major camp—are led, not simply to the prevention of injuries of the body, but to the remedying of injuries we cannot prevent. And what is our prospect? It is good. The prospect is good, because we are learning definitely, not to lose trust in remedies for the reason that we cannot apply them at once with accurate judgment, but to believe in them as powerful means of cure that are yet to be accurately employed. The prospect is good, because we are no longer picking up remedies upon remedies without object, trying them in any and every disease, and saying, "We have tried this or that agent, and have found this or that result;" but are now seizing certain agents, and are forcing them to tell us what they can perform on the body, what is their physiological action, and what antagonism of action they offer to the phenomena of disease. The prospect is good, because we are learning in respect to remedies, that their physical action, limited as it is to

action on oxidation, action on the process of animal natural dialysis, or action in controlling or exciting the nervous systems, may be learned by methods of physical research, that wait but to be tried, to be proved as true to us as to other physical enquirers.

From all these points of view the prospect is, that our conquests in the direction of cure will be as rapid and certain henceforward, as they have heretofore been slow and uncertain; that we shall gather insight as to what can and cannot be done for cure; and that when we say a cure can be effected, we shall carry out what we say with the confidence of men who have the positive in their hands, and the knowledge that guides it.

THE LAST ATTAINMENT.

In the future of physic, as we advance in the directions I have tried to signalize, we shall stand firmer and fairer with the world. But our success shall not be perfect until yet another, and of all the mightiest, truth breaks upon us, viz., that the solemn and august secret of our power, is, not in the amassment of wealth by our professional exertion, not in the amassment of popularity by it, not even in the creation by it of that future fame and name in history, which all men of noble instinct and noble nature would die to secure, but in the accomplishment by it of one simple end, *the happiness of mankind*. In this accomplishment lies our own happiness, and with it all true and worthy power, all true and lasting glory. Meted out ever for this end we require no other incentive for research, no other corrective of research, and no other protective against schismatic foes: nay we require not even reward of gratitude, grateful though that may be when, spontaneously, it flows at our feet. It is a simple formula of living action this; but how potent! Is this professional desire, is this act, is this practice which we daily do, in desire, in act, in practice, is it for the happiness of the individual, of the race? Shall the conscientious answer be Yes? Then is the act strong, unassailable, and, though it even partake of error, holy. Shall the answer be No? Then is the act weak, easily controverted, bad. This is not moral axiom, it is scientific truth. To many in all time it hath been known, and medicine hath lived upon the knowledge: to many it is known now, and medicine is sustained by the knowledge: but in the future *all* must know it; it must be the perennial force hidden in our hearts; our unspoken secret, worthless were it revealed. It must be the bond between ourselves, holding us as brethren in

such subtle sympathy, that envy shall be an instantly detected deformity, repulsive and retreating. It must be the bond between ourselves and the world, by which the world shall hold to us neither from wonder, nor admiration, nor other doubtful quality of recognition, but from confiding, habitual, abiding trust. Above all, it must be the fountain of our inspiration from the Lord of nature, whose whole scheme and design of creation, however strange it may seem, and to feeble sight devious, is ever towards and for the perfected happiness of His worlds of Life.

ON THE EFFECTS OF RECENT SANITARY LEGISLATION ON THE HEALTH OF THE METROPOLIS; AND ON OUR PRESENT URGENT SANITARY NEEDS.

BY JOHN WHITMORE, M.D.

THE subject upon which, in compliance with the request of the Council of this Association, I propose to occupy your attention for a few minutes this evening, is one which needs no apology for its introduction, inasmuch as it vitally concerns the health and well-being of the community at large, and for that reason, if for none other, must necessarily be of interest to us, as well as to every member of our profession.

We are beginning somewhat late in the day—too late I fear for us to claim any credit for that prudent forethought which wisely provides for anticipated evils—to comprehend that if we would live long and enjoy life, we must of necessity live under good sanitary conditions; and from the experience of the last fifteen years, during which time “The Metropolis Local Management Act” has been in operation, we may fairly claim to have acquired some amount of knowledge as to what those conditions really are. That our knowledge on this point is still very imperfect, and that we have a great deal to learn, is proved to us by our every day’s experience. We are satisfied beyond all doubt or question that fresh air, good ventilation, efficient drainage, and an abundant supply of pure water, are important auxiliaries to health. But we are not, I fear, equally well assured that the measures proposed, and in many localities adopted, for the suppression of contagious epidemic diseases, are the best that can be devised; and that—when by some brilliant discovery the present highly controversial question as to the mode of existence of contagious matter, and the conditions atmospheric or otherwise necessary for its dissemination, shall have been determined,—they will not be found almost, if not altogether, inoperative.

But the object of this paper is not to speculate upon our present ignorance of the laws which govern life and health, or upon the many diverse and contradictory opinions held upon that subject, but rather to enquire how far the various sanitary enactments now in operation have accomplished the object for which they were made, and what, in the present social and physical condition of the inhabitants of this metropolis, constitute our most important sanitary requirements.

Before proceeding to consider the effects of sanitary legislation upon the public health, it may be desirable briefly to review some two or three of the more important Acts of Parliament that have been passed during the last twenty-five years. With regard to any statutes existing anterior to that time it will not be necessary to notice them, for they were nearly all more or less of local rather than of general application, inasmuch as it was the practice for the inhabitants of populous districts to obtain special provisions for themselves. Hence private or local Acts for the suppression of nuisances in towns were very numerous, and were for the most part adapted to the particular requirements of the place for which they were promoted; but where the local wants were not sufficiently urgent, or where on the other hand local interests were opposed, the attempts to obtain local Acts failed.

It was owing partly to the reports of several Commissions which had been held, in 1838 and subsequent years, to enquire into the nature and existence of nuisances which generated contagion amongst the lower classes, and partly to the general alarm created by the approach of Asiatic cholera, that Parliament in 1845 passed an Act, 9 and 10 Vic., c. 96, "for the removal of certain nuisances, and the prevention of contagious and epidemic diseases." This Act, intended at first to be only temporary in its duration, and to terminate in the autumn of 1847, was not, in consequence of the continued imminence of cholera, allowed to expire, but was renewed in the year 1848, and made perpetual under the name of "The Nuisances Removal and Diseases Prevention Act of 1848," 11 and 12 Vic., c. 123.

An important defect in this Act was, that the part of it which related to the prevention of diseases could only come into operation as the necessity for its summary provisions should from time to time arise.

"The Public Health Act" of the same year, 11 and 12 Vic., c. 63, we may next briefly notice. By this Act the General Board of

Health was established, to which were given certain powers with respect to the construction of sewers, drainage, &c., and the abatement of nuisances of various kinds; as also the management of streets, public pleasure grounds, reception houses for the dead, &c. With regard to this Act it may be stated, that by establishing the General Board of Health it supplied a convenient and responsible power for carrying out in Great Britain those measures of precaution which were rendered necessary by the then impending national calamity. In the year 1849 another Act, the 12 and 13 Vic., c. 111, and known as "*The Nuisances Removal and Diseases Prevention Amendment Act*," was passed, for extending the powers of the Board of Health in relation to the removal of nuisances and the prevention of diseases, and for supplying clauses the absence of which had rendered the former Act defective in its operation. From this period until the year 1855, sundry other Acts were passed, which, being either supplemental to or amendments of existing Acts, it is not necessary to notice.

In the session of 1854 Sir Benjamin Hall, the then President of the Board of Health, introduced into Parliament a Bill which proposed to repeal entirely the former Acts and to create new bodies, to which should be entrusted the enforcing of legal measures for the prevention of nuisances, and which should also carry out the regulations of the Board of Health for the prevention of diseases. At the same time he introduced an extensive Bill to repeal "*The Public Health Act of 1848*." These measures were both referred to a Select Committee, who reported in favour of the Bills as then amended. After much discussion and some additional amendments, they passed both Houses of Parliament, and became ultimately 18 and 19 Vic., c. 116 and c. 121, and known respectively as "*The Diseases Prevention Act*," and "*The Nuisances Removal Act*," of 1855.

With regard to the former, *i.e.* "*The Diseases Prevention Act*," an opportunity for testing its efficacy was afforded by the last visitation of cholera, and although it was on that occasion supplemented by many important orders of the Privy Council to meet emergencies for which it did not provide, it cannot be said to have achieved any great success. The epidemic marched on its devastating course in certain localities very much as it had done on previous visitations, and as in all human probability it will continue to do until the light of scientific research shall have dispelled the obscurity which not only surrounds this, but other like periodic scourges.

Under the provisions of the second, or "*The Nuisances Removal*

Act," the sanitary work of this metropolis has for the last fifteen years been mainly carried out. Many of its clauses when practically applied were found to be defective, and these have been amended by subsequent Acts, to one of which I shall presently allude. But with regard to this Act it is only just to say that it has been so far successful in its operation, that many previously existing nuisances have been summarily dealt with and permanently removed; and although the results upon the public health have not been so marked or apparent as might reasonably have been expected, it may fairly be attributed to the counteracting effects of other great evils which grow with the growth of population, and for which the legislature has not yet provided a remedy.

One other Act only which, before quitting this part of my subject, it may be well to notice, is "The Sanitary Act of 1866," 29 and 30 Vic., c. 90. This Act amends in several important particulars the Act of 1855, and contains clauses which confer upon vestries and local boards the power of dealing with evils of great magnitude, which were before unassailable. By the 35th section of this Act, local authorities on application to one of Her Majesty's principal Secretaries of State, may be empowered to carry out regulations for the following purposes:—

(1) For fixing the number of persons who may occupy a house or part of a house let out in lodgings.

(2) For the registration of such houses.

(3) For inspecting them and keeping them in a proper and cleanly condition.

(4) For enforcing proper privy accommodation, ventilation, &c., &c.

(5) For cleansing and limewashing such premises at stated periods.

This section is obviously one of great value, since it is calculated to provide much increased comfort (if it provides nothing else) for the poorer classes. But alas! like some other sections contained in this Act, and which singularly enough happen to constitute the most important of them all, it "keeps the word of promise to our ear and breaks it to our hope." It is not, as it should be, compulsory, but permissive; local authorities may adopt it or not, as they think proper. Need I say that with a body of gentlemen the majority of whom are impressed with the fixed idea that the very perfection of local management consists in keeping down the rates, such a clause is not likely to find favour? It will therefore occa-

sion no surprise when I say, that up to the present time not more than two or three of the metropolitan parishes have adopted it.

With this cursory review of past sanitary legislation, we may now proceed to consider what have been its results, so far as it concerns the health of the population. I might go further, and add, so far as it concerns also the social comforts and material prosperity of the working classes; but to consider this latter subject—interesting and important as it undoubtedly is—would be to open up a wide field of enquiry which time will not permit me to enter upon.

The sources from which we are accustomed to obtain information as to the effects of sanitary improvements upon the public health, are the annual reports of the Registrar-General. From these we get important statistics as regards the death rate, the rate of mortality at different ages, and the number of deaths in each of the different diseases which make up the aggregate mortality. These statistics are to a certain extent valuable, but they will not supply all the information that is required to enable us to arrive at an opinion that is entirely satisfactory. We want for the purpose a sickness rate, or in other words we need that which we have long contended for, and which we shall ultimately obtain, viz., a Registration of Disease. I have long been of opinion that to estimate the healthiness of a place or district merely by its death rate is fallacious; for it may and indeed often does happen that sickness will prevail to a very large extent, unattended by even an average mortality; whilst on the other hand, sickness may be limited as to the number of persons attacked, and yet the prevailing malady unusually and excessively fatal. This we not unfrequently see in the ordinary miasmatic diseases of children, which at one time will be of the mildest, and at another of the severest kind.

With regard to the death rate, we find from the Registrar-General's returns, that the annual rates of mortality in London, extending over a period of thirty years, from 1840 to 1869 inclusive, show a mean of 24.35 per 1,000 of the population; for the ten years 1840-49 the mean was 25.16; from 1850-59 it was 23.63; and from 1860-69 it amounted to 24.25. From these figures we derive the not very encouraging fact that for the last ten years, during which sanitary reforms have been actively carried out in all parts of London, there was but a trifling reduction in the death rate as compared with the whole period of thirty years, and an actual increase as compared with the ten years 1850-59, an increase which may be estimated at about 1,500 deaths yearly. If we now ex-

amine the death rates of the five groups of districts of the metropolis, which are the North, South, East, West, and Central, we shall find results more in accordance with what might be expected as consequent upon the relative sanitary state of each; but in neither of them, except in the Southern group, was there any decreased death rate during the last decennial period. In the Northern, which is the highest of all, the best drained, and having for the most part an excellent water supply, the annual mortality is lowest, the mean for the last thirty years being only 22·87 per 1,000; whilst in the Eastern group, which lies very low, where the water supply is not always satisfactory, where the poor and destitute population is excessive, and where nuisances beyond the control of the sanitary authorities abound, the mean for the same period is 26·09 per 1,000. As I have before stated, the mean mortality in all except the Southern group was greater during the last decennial period than in the one preceding it, but in the Southern group the reduction was gradual and satisfactory; here the death rates for the three decennial periods were respectively 26·25, 24·36, and 23·23 per 1,000; and if we take the quinquennial periods, the results will be equally satisfactory.

Let us now enquire into the rates of mortality at different ages, and if we can here show that they have sensibly decreased during the last fifteen years amongst young children, it will to some extent modify the otherwise unfavourable results as shown in the total death rates at all ages; for we know that with infants and children below the age of five years, a very large proportion of the deaths is caused by diseases belonging to the zymotic class, many of which, if not produced, are no doubt greatly aggravated, by defective sanitary conditions.

I would here take the opportunity of saying that I do not altogether concur in the views entertained by many of my professional brethren, as to the important part which nuisances injurious to health generally play in the extension and aggravation of some of our most fatal epidemics. As an illustration of this, I may refer to the epidemic of scarlet fever, which now and for the last sixteen months has been prevalent throughout England and Wales. All my experience of this disease, and I may claim to say that it is not inconsiderable, convinces me that it is but little influenced by defective sanitary conditions. In the mansions of the rich as in the miserable dwellings of the poor, in localities remarkable for their healthiness and salubrity as in the most crowded courts and

alleys reeking with filth and abominations, the disease has been alike virulent and fatal. Indeed, speaking from my own personal knowledge of its progress in St. Marylebone, I should say that the poorest and most destitute, those who live in filth and misery, and under the worst possible sanitary conditions, have suffered the least from it.

To return to the mortality at different ages of life, it will be sufficient for my purpose to show the mortality amongst children in London under one year, and under five years. This I have obtained for the last nineteen years, from 1851 to 1869 inclusive. Amongst children under one year, the mean death rate to population for the whole period was 5·39 per 1,000: in the first quinquennial period 1851-55, it was 5·25; in the second, 1856-60, it was 5·18; in the third, 1861-65, it was 5·30; and in the remaining four years, 1866-69, it was 5·99. Amongst all children under the age of five years, the mean death rate for the nineteen years was 10·27 per 1,000 of the whole population; in the first quinquennial period it was 10·10; in the second, 9·87; in the third, 10·58; and in the last four years, 10·72. Another and perhaps more reliable mode by which the death rates of children may be determined, is not by taking the whole living population as the basis of calculation, but merely the population comprised within the ages at which the deaths occur; thus we find that of the whole population in London under the age of five years, in the year 1851, 7·4 per cent. died; in the year 1861, 8·0 per cent. died; and in 1869, 8·6 per cent. died.

It is to be regretted that for the want of a proper registration of diseases the sickness rates of the metropolis in different years cannot be ascertained. A partial registration, however, has been kept up in St. Marylebone during the last twelve years, to which in the absence of other statistics on the subject I may refer. It comprises weekly returns of all new cases of disease coming under treatment in eleven charitable institutions in the parish, amongst which are included returns from the Middlesex Hospital, from the principal local dispensaries, and from all the parochial surgeons. From these, which return a yearly average of about 70,000 new cases of disease, we find that in the four years, 1859-62, the annual sickness rate was 38·5 per cent. of the living population of the parish; in the four years 1863-66, it was 42·3 per cent.; and in the four years 1867-70 it was 44·2 per cent. Let us now take the sickness rates of eight of the principal zymotic diseases, viz., small pox, chicken pox, measles, scarlet fever, diphtheria, whooping cough, diarrhoea,

and fever. In the first four years the annual sickness rate from these diseases was 4·7 per cent., in the second it was 6·9 per cent., and in the third 6·9 per cent.

I am aware that these returns, derived as they are from a limited source, are not to be accepted as a correct indication of what may have been the sickness rate of London during the same periods; but inasmuch as they have been obtained from a parish where, to the credit of the authorities, it may be said that sanitary improvements have been carried out with a degree of liberality and energy unsurpassed by any other parish in the metropolis, the fair inference is that they are rather below than above the estimate.

Amongst the annual death rates of London for the last thirty years, there are some that are unusually high; these are caused either by the fluctuations of seasons, or by the zymotic activity of diseases, or by both; but inasmuch as an increased mortality in one year is generally succeeded by a reduced mortality in the next, the decennial averages are not much affected by these causes.

Looking, now, back to the facts revealed to us by the general death rates, the death rates of young children, and the sickness rates, we might under a momentary feeling of disappointment jump to the conclusion that sanitary legislation has been a dead letter, and that it has done nothing towards the saving of human life or the alleviation of human suffering. Such an opinion, however, would be very erroneous and opposed to facts, which a little consideration will enable us to realize. In the last twenty years the population of London has increased from 2,373,000 to 3,170,000, but there has been no corresponding increase in the superficial area over which that increase has been distributed. The result therefore is that many localities, especially those inhabited by the poorer classes, have year by year become more densely populated, and the reasonable inference would be that in such localities the death rate would become augmented. Such, however, is not the fact, and it may, I think, be attributed to sanitary improvements. From this, then, we may fairly assume that without the sanitary work of the last fifteen years the death rate of London would have been infinitely higher than it now is; but we may also assume that, had that work been more complete, had sanitary enactments been more comprehensive and more compulsory, the death rate would have been, spite of all opposing influences, much lower.

That the death rate of the metropolis has not declined in the ratio of the improvement in its sanitary condition is, I think, mainly

attributable to this one fact, that the means of providing proper house accommodation for the artizan and labouring classes has in no degree kept pace with the growth of population. Of what avails it that nuisances from drains and closets are removed, when every room in the house is crowded, when eight or ten persons occupy an apartment which only affords fair breathing space for half the number, and when these evils, alike destructive to health and morals, are greatly aggravated by the dirty habits of the people themselves. The construction of railways through many of the most densely populated districts of London has no doubt facilitated public traffic and convenience, but it has also entailed upon the poor a great amount of hardship. Viewed in the light of its sanitary advantages, one cannot look upon the demolition of wretched houses in these poor districts without feelings of something like satisfaction, since it lays open to the purifying influences of light and air extended areas of space, which for many years had been hotbeds of disease, and where thousands of human beings, daily poisoned by noxious exhalations, had dragged out a brief and sickly existence. But this feeling is alloyed by the sad reflection that, although the poor are routed out from such pestilential spots, they are driven to seek shelter in others equally and even more pestilential; for with them the choice is one of two evils, either the open streets, or some miserable room in a house already overcrowded, where the poisonous gases exhaled from the lungs of many human beings huddled together through long winter nights, slowly perhaps, but surely, undermine the health, stunt the growth of the children, and deprive them in adult age of that bodily strength and vigour which constitute the richest inheritance of the labouring man.

These reflections lead me to a consideration of the last subject to which I shall call your attention—"What are our present sanitary requirements?" Of these there are many, which, did time permit, it might be profitable to discuss. I shall therefore merely notice some, and conclude with a few remarks upon two of them, which are of surpassing importance and magnitude.

In the first place, various amendments are needed in our present sanitary enactments to facilitate the prompt and efficient working of them, and many clauses which at present are merely permissive should be made compulsory. We want open spaces in London for the healthful recreation of young children. We require public dining rooms for the labouring classes, where they can obtain wholesome and nutritious dinners at no greater cost than that which they pay

for the ill-dressed indigestible food upon which they now exist. Increased space and improved ventilation in workshops is also greatly needed. But the most urgent, by far, of our sanitary requirements, are improved house accommodation for our artizan and labouring classes, and more stringent laws for preventing the spread of infectious and contagious diseases.

For improving the dwellings of the poor various plans have been suggested, one of which has to some extent been adopted. I allude to the erection of model lodging-houses. These buildings have much to recommend them; the rooms are lofty and well-ventilated; the arrangements for domestic purposes, such as cooking, washing, &c., are good, whilst the drainage and water supply are all that can be desired. In most of them the terms of occupancy are necessarily somewhat stringent, and to a large class whose habits of life are opposed to all rules of order or decency they are no doubt objectionable. In the parish of Marylebone there are four of these buildings, which are always fully tenanted, and from my own knowledge I can state that their occupants are generally very healthy. Further I may observe, and this is by no means unimportant, they pay to the shareholders a fair interest for their investments.

Suburban villages for the working classes have also been proposed, and strongly advocated. The name is attractive, and suggestive no doubt, to the poor man, of pure air, green fields, neat garden plots, and a host of other little comforts denied to him in his dismal London home; but the class of dwellings which could be let at so low a rent as to be within the means of a working man must necessarily be small and cheaply constructed. To these I see many objections, both sanitary and social; the rooms would be small, low roofed, and insufficiently ventilated; in wet weather the damp would probably penetrate through badly cemented walls, or rise from the surrounding earth and produce colds, rheumatism, and other like diseases; the house drains would get out of order; the buildings themselves would continually need repair, and after a few years fall into decay.

A third scheme proposed is the removal of cow and slaughter-houses from the metropolis, and the erection of dwellings for the poor on their sites. One very great merit of this scheme is, that it gets rid of an existing abomination.

It is, I think, much to be desired that the attention of Parliament should be given to this important subject. The wretched dens in

which the poor of London are compelled to live, or rather slowly to die, are a disgrace to our civilization; for whilst our increasing wealth and intelligence are manifest in many ways amongst the upper and middle classes, they have effected little or nothing towards the amelioration of the social condition of the poor, who in all that relates to home comforts and the wants of domestic life, are but little better provided for than if they had lived fifty years ago.

For the last subject of this paper a minute or two will suffice. In order properly to comprehend the difficulty of making laws that shall prevent the spread of epidemic, contagious, and infectious diseases, it is only necessary to consider the many and various modes by which infection is disseminated; and the more we reflect upon this, the more convinced we shall become that nothing short of complete isolation of the infected person, from the period of his first attack until every particle of the poison of the disease shall have been eliminated from his system, will suffice to arrest even in a limited degree the progress of these fatal maladies; and here we may pause to ask—How in the crowded dwellings of the poor is this to be done?

Thousands upon thousands of poor families in this metropolis can only afford to rent one or at most two rooms, and how is it possible for them to adopt any such precaution as this? The answer will be that patients so circumstanced must be removed to a hospital, and in that I fully concur, believing it to be the only solution of the difficulty.

A further obstacle will be found in the habitual disregard of the laws which exist already. Amongst the poor, of whose habits and modes of life I have of late years had some experience, there is very great indifference in most things that concern the safety and welfare of their offspring. It is a thing of daily occurrence to see little children living in a house let out in lodgings to several families, running in and out of a room in which other children are lying suffering from an attack of measles or scarlet fever, and any expostulation with the mother for permitting it is met with some frivolous excuse. But even amongst the middle and higher classes there are many who are open to censure in this matter. With them it is no indifference or want of care for their own families, but a selfish disregard of the safety of others. How frequently it happens that children of these classes are removed from London to watering-places, at the very time when their bodies are throwing

off the largest quantities of the poison of the disease from which they have been suffering; and who can estimate the amount of mischief which results? The railway compartments in which they travel become centres of contagion, and the watering-places they visit owe to them very often the first introduction of a disease which in a short time expands into a serious and fatal epidemic. The least that can be said of the persons through whose neglect all this evil arises is, that they wilfully break the laws and ignore altogether those paramount duties of citizenship which are implied in the excellent axiom, "*Salus populi suprema lex.*"

In order to give practical effect to the opinion before expressed, that complete isolation of a person suffering from a contagious or infectious disease is necessary, I would supplement the laws already in force by some others of a more stringent kind.

It should be provided—That a person attacked with either small pox, scarlet fever, measles, or fever, should be at once removed to a separate apartment. That it should be compulsory on the medical attendant immediately after his first visit to give written information of the case to the local authority, by whom a competent inspector should at once be sent to inspect the premises and give orders for the immediate abatement or removal of any existing nuisances. That such inspector should at the same time leave with the parents or friends of the patient, a printed notice, setting forth the rules to be observed for preventing the spread of the infection, the nature of the disinfectants to be used, and the methods of using them; these rules to be drawn up by the College of Physicians, or some other competent body. That the patient during his illness should not be visited, except for some urgent purpose, by any other persons than the medical attendant and the nurse. That he should not be permitted to leave the apartment or mix with other persons until the medical attendant had certified in writing to the local authority that his recovery was complete, and that he was no longer capable of communicating the disease. That on the receipt of his certificate the inspector should again visit the house for the purpose of seeing that the sick chamber and its entire contents had been properly disinfected, and that, if done to his satisfaction, he should give a certificate to that effect to the parents or friends of the patient. That in cases where no separate apartment could be appropriated to the use of the patient, he should at once be sent to the hospital. That any infringement of these rules and regulations should subject the offender to fine or imprisonment, at the discretion of the

magistrate hearing the case, and that the local authority should be the prosecutor.

In conclusion, I may observe that any further improvement in the healthiness of this vast metropolis must, in a great measure, depend upon the energy and earnestness of purpose with which our sanitary laws are administered. If vestries and local boards accept them and the duties they impose with a mental protest against their necessity,—if these gentlemen also fail to discern in the means provided for improving the health of the population that which is apparent to every intelligent observer, viz., a direct tendency to diminish pauperism,—the result will be that another decade will pass away, and our sanitary condition be in no degree benefitted. But from the spirit manifested of late in many metropolitan parishes, I perceive a growing interest in sanitary matters, and a more general recognition of sanitary efforts. To stimulate and direct those efforts, and to devise the means for arresting the progress of our common enemies, infection and disease, are the enviable privileges and duties of our profession, and of this I am sure, that in the faithful discharge of those duties the members of this Association will not fail.

POPULATION OF LONDON in the middle of each year from 1851 to 1869 inclusive, with the TOTAL BIRTHS, and the DEATHS and DEATH RATES of CHILDREN under five years and one year respectively.							
Year.	Population to the middle of each year.	Total Births.	Deaths of Children.		Death Rate per 1,000 of Population.		Year.
			Under five years	Under one year	Under five years.	Under one year.	
1851	2,373,081*	78,300	22,761	12,081	9.59	5.09	1851
1852	2,416,631	81,250	22,507	12,272	9.31	5.07	1852
1853	2,460,378	82,254	24,713	12,981	10.04	5.27	1853
1854	2,504,300	84,885	29,501	13,896	11.77	5.54	1854
1855	2,548,382	85,532	25,025	12,959	9.82	5.08	1855
1856	2,592,603	87,430	24,128	13,130	9.30	5.06	1856
1857	2,636,943	89,577	25,512	13,931	9.67	5.28	1857
1858	2,681,384	89,012	28,472	14,280	10.61	5.32	1858
1859	2,725,905	92,909	26,226	13,976	9.62	5.09	1859
1860	2,770,483	93,414	26,939	14,269	9.72	5.15	1860
1861	2,815,101*	97,064	29,090	15,076	10.33	5.35	1861
1862	2,859,734	97,850	28,625	13,999	10.00	4.89	1862
1863	2,904,363	102,119	31,216	15,433	10.74	5.31	1863
1864	2,948,963	102,625	33,247	17,314	11.27	5.86	1864
1865	2,993,513	106,803	31,615	18,284	10.56	5.10	1865
1866	3,037,991	108,665	34,565	18,733	11.37	6.10	1866
1867	3,082,372	112,691	30,341	17,973	9.84	5.83	1867
1868	3,126,635	113,937	32,780	18,891	10.48	6.04	1868
1869	3,170,754	112,232	35,459	19,078	11.18	6.01	1869

* Census.

Population of London under five years of age in 1861, 362,296 — Death Rate of these Children, 8.0 per cent.

NEW CASES OF SICKNESS COMING UNDER TREATMENT IN ST. MARYLEBONE, (Including New Cases from <i>Eight Zymotic Diseases</i> ,) RETURNED FROM ELEVEN CHARITABLE INSTITUTIONS IN THE PARISH.												
Year.	New Cases of Sickness from all Causes, including Accidents.	New Cases of Sickness from Eight Zymotic Diseases.							Total Sickness from Eight Zymotic Diseases.		Sickness Rate per 1000 of Living Population of the Parish, from Eight Zymotic Diseases.	
		Small Pox.	Chicken Pox.	Measles.	Scarlet Fever.	Diph- theria.	Whooping Cough.	Diarrhoea.				
1859	62,290	123	93	520	471	6	429	6,615	8,549	292	52.8	47.6 mean of 4 yrs.
1860	57,465	223	140	663	254	10	453	2,914	4,939	282	30.5	
1861	66,431	16	204	444	230	53	761	6,683	8,778	387	54.2	
1862	62,854	25	126	688	368	61	550	6,197	8,557	542	52.9	
1863	70,556	721	145	642	858	66	565	9,056	12,507	454	77.3	69.1 mean of 4 yrs.
1864	69,296	73	238	594	444	54	844	8,809	11,865	809	73.3	
1865	67,109	194	115	622	406	35	680	6,992	9,800	756	60.6	
1866	67,168	188	89	545	333	30	673	8,296	10,636	482	65.2	
1867	76,815	337	Returns omitted.	894	788	35	734	7,711	10,889	390	66.8	65.3 mean of 3 yrs.
1868	70,338	55		889	588	27	641	9,786	12,156	170	74.5	
1869	69,070	49		487	871	26	1,010	6,172	8,946	331	54.8	
	739,392	2,004	1,150	6,998	5,611	403	7,340	79,231	107,622	4,895		

DISCUSSION ON DR. WHITMORE'S PAPER.

DR. HARRISON (Lincoln) wrote—So far as my experience goes in sanitary matters, the fault seems to be, not that the Sanitary Acts are inadequate to meet most emergencies, but that they are permissive and not compulsory; by that I mean where the authority “may do” so and so, it should be “must or shall do” so and so.

Another defect, in my mind, is that the authority to carry out the laws is probably not always in the hands of the right persons; for where the authority is elected by the ratepayers, the cry is sure to come up of, “Look to the rates! Keep down the rates!” So that the death rate and everything else is put aside for the reduction of the local rate. In fact, “proposals of amendment in sanitary law to a great extent resolve themselves into projects of reform in the constitution of authorities.” (“Medico-Chirurgical Review,” October 1870, p. 289.)

MR. HARRIS (Redruth) wrote—I have lately attended a great number of cases of typhus fever amongst the poor in two large parishes near Redruth. I have never known a case where there has not been either a pig’s house, or fowls kept in, or close by, the diseased house, or gutters, catch-pits, or filthy privies, overcharged and emitting noxious effluvia. Choked drains of filthy and soapy water and urine, have been the cause of every case of fever.

There should be a better supply of pure water for dwelling-houses, and all pumps and wells should be abandoned that are now in use near dwelling houses, because so much filthy surface water soaks through the earth into the wells, and injures the drinking water. The poorer classes are filthy in their personal habits, and seldom wash their bodies or go into a bath. Many of the Cornish seldom wash their feet, except, as they are obliged to do, by daily working underground in mineral waters, and when they come to the surface to change their clothes, they are compelled to wipe their feet. This is the reason why the miners’ feet and legs, as a rule, are cleaner than the feet of the miners’ wives and of the working classes in general who are of the gentler sex. I have repeatedly known adult females who have not

washed their feet for nine months, and in some cases for years, as I have been told, they were afraid that they should catch cold afterwards. In Cornwall the poorer classes think very little of ventilation in their bedrooms, and if there should be a chimney and fire-place in their bedrooms, it is generally choked by a bag stuffed with straw or with rags, to keep out the cold air. When I enter such rooms, I generally order this to be removed, or pull it down myself, there and then; sometimes to the annoyance and discomfort of the sick folks, who do not understand anything about sanitary measures.

The poorer classes have two rooms, one down, and the other upstairs; sometimes there are three, or two beds, in one small room, and several children, with the parents, all sleep in one room, until the boys and girls get bigger, when they contrive to get a second bedroom for decency's sake.

The houses of the working classes should be built higher, especially the bedrooms.

In the parish and town of Camborne, four miles west of Redruth, it was proposed about six years ago by the thoughtful portion of the town, to have a Board of Health. This was violently opposed by the majority of the ratepayers, who are miners and small tradesmen, occupying small houses, badly ventilated and worse drained. There were pigs' houses and filthy privies and choked drains all over the town. A great number of Irish had migrated to Camborne for the purpose of working in the copper and tin mines, with which the town is surrounded. There was no supply of water, but soon afterwards the inhabitants began to think that they ought to have good water to drink, and they commenced to bring in water from a distance of some miles, by virtue of the powers of an Act of Parliament. The water-works and the supply of water will be complete in a short time. Meanwhile, fever has been *invited* to enter the houses of the poor, and of the more genteel classes, and some have removed from the infected, undrained town to more healthy localities. The population of Camborne is about thirteen thousand, and the death rate *lately* has been *forty-two per thousand*. Six funerals have taken place daily, and the deaths have been twenty-two per week occasionally, chiefly amongst the children and younger classes, but some persons of mature age have been removed by this pestilential fever, if I may so call it. It is said to be scarlatina in its worst form.

In Redruth, however, we have a Board of Health, the town

is well and properly drained, the roads and footpaths are kept orderly and clean, filth is regularly removed from the surface, pure water has been brought into the town in all directions at a great expense, ventilation is attended to by a clever surveyor, the lodging-houses are well watched to get the drunken vagrants out of this town, and no house can be built without the consent of the Board, and in compliance with proper regulations as to the height of the rooms, drainage, closets, &c. The death rate in Redruth is seventeen per thousand of our population.

In the town of Penrhyn, two miles from Falmouth, fever prevailed fearfully last year. A physician was sent down from the Privy Council Office, and he made a careful house to house inspection, nobly assisted by the two able surgeons in that borough. Almost every house had some sort of filth close by it, and many loads of dung in several yards or courts had been carefully preserved by the poorer inhabitants for sale to the farmers who reside outside and around Penrhyn. The drinking water was properly analysed, and found to be highly dangerous, and saturated with noxious animal and vegetable matter. Nobody could be safe in drinking it, and this was the only supply for all the town of Penrhyn. The rate-payers have now thought of getting a better supply of pure water from a distance of about two miles from Penrhyn, and the drains have been cleared, and things are now going on much better. Many of the respectable inhabitants were found to have stinking, choked drains under the rooms in which they ate and slept.

DR. TANNER (Henrietta Street) wrote—Apropos of Dr. Whitmore's paper, I wish to express my conviction that too little attention is paid to the way in which contagious diseases may be carried about by nurses. The following case shows how powerless we are to prevent disease being so spread.

On or about the 15th of October I met Dr. Pocock, of Brixton, in consultation on a case of puerperal fever. Three days afterwards we had a second meeting, and I was rather pleased at finding a very efficient-looking nurse had arrived a few hours previously. The patient being in the greatest peril we sent for the nurse, after our consultation, to give her directions. These instructions, however, she said she could not receive, as she was engaged in nursing a lady who had been delivered a few days previously, and she had only obtained permission to be away from her for some twelve or twenty-four hours. I at once told this nurse how perilous it would be for her to return to the

lady, that she might very likely carry the contagion of the fever to her, and that if she did so, death would probably be the result. Dr. Pocock also spoke emphatically to her. Notwithstanding this, however, the nurse returned to her first place, with what result I have not been able to learn. In this case nothing more could be done by us. We knew not the name or address of the lady she was returning to; while, as far as I know, we were powerless to restrain her.

DR. TRIPE.—One of the chief difficulties in carrying out the various Nuisances Removal and Sanitary Acts arises from their large number. Several have been partially repealed, and others are incorporated with older Acts, so that it is extremely difficult to decide what course should be taken in serving notices or in taking legal proceedings.

The dependence of the medical officers of health on the local authorities is another obstacle to the efficient working of the sanitary laws; as at present their appointments can be determined at any time, and without any reason being assigned for their dismissal. This certainly ought not to be, especially as the duties of a medical officer of health are to a great extent at variance with his ordinary work as a medical practitioner: partly because persons are of opinion that he is far more likely to bring infectious diseases into a house than another practitioner, and partly because it is scarcely possible to carry out efficiently the duties of a medical officer of health, with attendance on committees, at police courts, &c., and yet attend to the urgent calls which occur in ordinary medical practice. Another, and perhaps the greatest difficulty of all, arises from the Acts being permissive, as regards the local authorities, instead of being compulsory. Reverting to the difficulties arising out of the large number of Sanitary Acts, I would observe that the Royal Sanitary Commission has taken but little evidence on the laws affecting the metropolis alone, and that therefore their Report will probably contain little else than a recommendation for the consolidation of all the Nuisances Removal Acts into one. This is matter for regret; although with a consolidated Nuisances Removal Act we could get on very well, especially if, as I pointed out at a meeting of the medical officers of health, when a paper on this subject was read by Mr. Liddle, and referred to a committee of which I was chairman, this revision extend to all the Nuisances Removal Acts, so as to include their provisions in one consolidated Act.

The chief difficulties which prevent an efficient carrying out of the powers given under the Acts are caused, as previously stated, first, by the Acts being permissive instead of compulsory. In my district there is not much cause of complaint, as the Hackney Board orders any reasonable suggestion for the abatement of nuisances to be carried out. Still, I have found much care to be necessary in putting matters in a proper light before them. For instance, we have a mortuary and *post-mortem* room in an old tower, which has been fitted up by successive steps, so as now to be sufficient for all practical purposes; but if I had asked for the whole amount to have been laid out at one time, I should probably not have procured them. If the Act had been compulsory, nearly all the metropolitan districts would have had a mortuary instead of being without one. A similar remark applies to a disinfecting apparatus, which I have not as yet obtained, and which, I believe, very few districts have, although there is scarcely any other sanitary means more necessary for preventing the spread of epidemic diseases.

Secondly, another great difficulty arises from the want of a minimum penalty, so that too great a power is left in the magistrate's hands. In some cases extremely small penalties have been ordered by one magistrate, rendering the summons almost useless; whilst in similar cases almost the maximum penalty has been inflicted by another magistrate. I am therefore of opinion that a minimum penalty, say one-eighth of the maximum, should be fixed by a new Act. The same remark applies to the Regulations issued under the 35th section of the Sanitary Act. I regret that I did not recommend this clause in our Regulations.

The comparatively limited list of nuisances comprised under the Nuisances Removal Acts has also prevented me from obtaining orders in several cases. Thus the magistrates of our district refuse to make orders for the laying on of water to water-closets, or for providing water supply for cleansing dirty premises. They will not order traps to be provided for drains, or a drain to be repaired if it is broken, unless at the same time it is "so foul as to be a nuisance and injurious to health." I have had numerous cases where rats have escaped from the drain of one house, and caused a horrible nuisance in the adjoining one, and yet been unable to obtain an order under the Nuisances Removal Acts. The only course in such cases is to examine the drain, under the Metropolis Local

Management Act, at the expense of the vestry or board, and when the defective drain has been discovered, to serve a notice under the same Act, for repair of the drain. All this takes time and costs money.

Another difficulty has arisen from stoppages of drains causing a nuisance, not on the premises where the stoppage exists, but in adjoining houses. In several of such cases the magistrates have decided that notices should be served on, and if necessary, proceedings taken against, the owner of the premises where the drain overflowed, requiring him to drain separately into the sewer, and not against the owner of the premises where the drain was stopped. In one case a man intentionally blocked up a drain running through his garden, in such a way as not to create a nuisance on his own premises, but a most abominable one on his neighbours. I summoned the person who had blocked up the drain as the person creating the nuisance, but the summons was dismissed.

I have also been unable under any of the Sanitary Acts to prevent the carriage of offensive matters through my district, and have been compelled to take proceedings under the Police Act against persons bringing the refuse of gas-works during the day time through Clapton and Homerton, a distance of about two and a half miles. In this case I obtained a conviction only by acting as a common informer.

A very important defect in the Nuisances Removal Acts is that we cannot require water to be laid on to premises for domestic use. Where no water supply is laid on to a water closet, I generally obtain a supply for the house as well as to the closet, by serving a notice under the Metropolis Local Management Act; but in one or two instances the owner of the house refused to do more than supply the closet with water. I am therefore strongly of opinion that any house insufficiently supplied with water should be considered to be a nuisance.

Another difficulty arises very frequently from the round-about way in which offensive accumulations have to be removed. At present no action can be taken to compel an owner or occupier to remove accumulations of sewage matter, offal, or other things injurious to health, except under an order from the vestry or board, so that if a meeting takes place only once in a fortnight or three weeks, and a person persists in keeping it there the whole time, there is nothing to prevent him from doing so, unless the medical officer of health or inspector resides in the

district, and takes out a summons under the Nuisances Removal Amendment Act, as an inhabitant. I have several times taken out summonses in urgent cases, without waiting for an order. There is also another deficiency as regards the accumulation of dung, viz., that some magistrates do not consider that they can order a dung-pit to be provided with a cover. In large establishments the want of a cover is often productive of much annoyance to neighbours, through the continual escape of ammoniacal and other odours. These defects could readily be removed by power being given to the medical officer of health or inspector of nuisances, to serve notices for the immediate removal of accumulations of offensive matters, and to take out a summons if the notice be disobeyed; or to remove the manure or other offensive matter and sell the same, charging the cost of removal on the owner, if the offensive matter should not sell for enough to pay the cost.

The want of uniformity in the Regulations issued under the 35th section of the Sanitary Act is also another sanitary difficulty, for although the Regulations were submitted to the Secretary of State for his approval, previously to their being declared in force, yet what is overcrowding under them in Hackney is not overcrowding in Bethnal Green or Shoreditch, which are contiguous districts. This arises from four hundred cubic feet of air space being sanctioned as the minimum for each adult living and sleeping in a room in Hackney, and three hundred and fifty only in Bethnal Green and Shoreditch.

There is also another strange incongruity in the Nuisances Removal Acts, viz., that an inhabitant of a district can take out a summons against any person creating a nuisance such as can be removed under the 12th section of the Act for 1855, without requiring the person to abate the nuisance; and yet the sanitary officers cannot take such a step without first obtaining an order from the vestry or committee, and then serving a notice for the abatement of the nuisance. These and many other anomalies will I hope be removed by the new Act.

Another important point for discussion is whether or not there shall be inserted in the new Act the proviso, that it is necessary to show that the best practicable means have not been used to prevent or abate a nuisance arising on premises used for carrying on a trade, business, or process evolving effluvia. At present it is necessary to prove that the best practicable means have not been used, before a conviction before a magistrate can be obtained. I

am fully of opinion that this proviso should not be allowed to remain in any amended Act.

I will conclude these few remarks by stating my opinion that the new Act should be based on the following Acts and clauses of Acts :—

Nos. 3, 4, and 5 of section 60 of the Police Act.

Section 5 of Jervis's Act (rendering it illegal to aid and abet).

Sections 51, 52, 59, 64, and 76 of the Public Health Act, 1848.

Sections 81, 82, 83, 85, 86, and 205 of the Metropolis Local Management Act.

Sections 64, 66, 67, 91, and 105 of the Metropolis Local Management Act Amendment.

The whole of the Nuisances Removal and Amendment Acts, including Part II. of the Sanitary Act.

Also, the Bakehouse Regulation Act.

And lastly, that the costs and expenses should, at the option of the local authority, remain chargeable on the premises, or on the person owning the premises at the time when the first notice was served, and be recoverable in a summary manner.

MR. LORD fully endorsed the commendation given by the previous speakers to Dr. Whitmore's paper. That paper dwelt upon matters so important and self-evident to men experienced in working sanitary measures, that it would be almost supererogatory to make any addition to it. It struck him that the views of the last speaker were fully borne out by his (Mr. Lord's) experience in Hampstead. Mr. Alford of Haverstock Hill, with others, especially noticed the increase of fever in the high-lying districts; this was ascribed principally to the malaria in the underground "sewer gas" finding an exit in and around the houses in that locality. Additional powers must be given to medical officers of health, to secure to the public the full advantages of preventive measures against disease.

DR. CRISP said that it was scarcely to be expected that Dr. Whitmore, in the short time allotted to him, could touch upon many points connected with the public health that were of great importance. He (Dr. Crisp) could enumerate several, but he would only mention two or three that had not received notice. He had long advocated, irrespective of the town or city officers of health, a chief medical inspector for each county and large city, whose duty it would be to report not only on all matters relating to the health of man, but also upon epidemic diseases of our domestic animals,

as well as those of the vegetable kingdom. By this means great good would be effected, and much light thrown upon the etiology of disease in man. Unfortunately, the government did not approach this matter with "clean hands," for it gave its diploma both to the quack and to the legitimate practitioner, lifting up science with one hand and knocking it down with the other; making the qualified doctor pay a tax for his diploma stamp, and looking with equal avidity for the money of the quack. The injury to the public health, and the increase of mortality by means of quack medicines, were incalculable. In the case of children this was doubly apparent, for often valuable time was lost by means of soothing syrups, soothing powders, and other patented panaceas, and when the medical practitioner was called in, the disease had made too much progress for medicine to be of any avail.

Another great want in the metropolis and other large cities was a small-pox hospital, established by the government, so that all persons who desired it, and those who could not get proper attendance at home, could be removed there in proper vehicles kept for the purpose. This important matter should not be left to private charity, and until the government bestirred itself in these and other matters there was but little chance of improvement. At present, time was often lost, and the disease disseminated in consequence; poor people, moreover, could not pay the expense of carriage and the fee required.

Another matter he (Dr. Crisp) thought of great importance, viz., the supposed efficacy of disinfectants so-called. He had heard a gentleman say recently at the Medical Society of London that "he would not mind sleeping with a scarlatina patient, after the patient had been in a carbolic acid bath." He (Dr. Crisp) almost doubted the efficacy of the so-called disinfectants of all kinds, and there was little or no proof that they possessed the virtues attributed to them.

The last matter he would mention out of a long list, was the injury to the public health in large towns by residence underground. In London and its suburbs he believed (as he had stated in the Transactions, in his paper on Pulmonary Consumption,) that this was a fertile source of disease. Many persons in the neighbourhood of London spent nearly all their time in underground apartments, and children often slept there. Many of these habitations appeared to be snug and comfortable, but he (Dr. Crisp) believed they were the source of tuberculous and other diseases, to a greater extent than was generally supposed.

DR. WYNN WILLIAMS, after thanking the author of the paper for the very succinct form in which he had laid the subject before the meeting, and agreeing with the necessity of further legal powers being granted, remarked that in certain instances the power of removal should be made compulsory by legal enactment. He alluded especially to the compound householder; that is, where two or more families occupy the same house. When a member of such families became afflicted with an infectious or contagious disease, all members of the different families as a matter of course were exposed to the contamination. Notice ought, therefore, to be given to the Officer of Health to order the instant removal of the diseased person, at any rate on the expressed wish of any of the other inhabitants, to some hospital provided for the purpose, where he might be visited and attended, if desired, by his own medical adviser. Disease is, he felt convinced, propagated throughout the length and breadth of the land in a most systematic manner, owing to the non-removal of such patients. He had himself witnessed numerous instances where from six to ten families have occupied the same house, each family living entirely in one room, places of convenience being common to all. Most of the adult inhabitants were composed of artisans, such as tailors, shoemakers, milliners, sempstresses, &c., who not only sleep in this one room, but actually work there; that is, they bring home their work from the large establishments in the neighbourhood, to make it up in the very room occupied by any diseased member of the family.

Dr. Williams had seen articles of clothing before being sent to the depôt of the large tradesman, lying on the bed of a patient suffering from small pox. These articles are tumbled about in the shop of the tradesman with articles of a like nature, and are then sent home to the unfortunate wearers, who little dream that they are putting on what may be in truth termed their *mort-cloth*. He knew an instance where an article of dress was made in such a house as he described, for a member of the Royal family. Thus it is that they, like more humble individuals, are not exempt from small pox and other kindred diseases.

As regards open drains and stagnant puddles, he was bound to confess that he did not think they were so injurious as generally supposed. He spent his holidays last autumn in a part of Lincolnshire where scarlet fever of a mild type was raging amongst all classes, scarcely any children escaping who had not

had it before. It was remarked to him by a very intelligent practitioner in the town, that the patients living in close proximity to such open drains and puddles did quite as well, and were generally quite as healthy, as their more favoured neighbours. It is in the large country house of the wealthy proprietor, or in the public building, that outbreaks of fever too often arise, and may invariably, or almost so, be traced to the drinking water becoming contaminated by the sewage water—the pipes or drains leak, or have some communication with the well, pump, or cistern.

As to the use of disinfectants, in regard to their efficacy he felt somewhat sceptical, or at any rate to the efficacy of those in general use, and in the way in which they are employed. It appeared that deodorizers, antiseptics, disinfectants, destructives, were all spoken of and treated as disinfectants proper. Now nothing could be more injurious and fallacious. Take, for instance, quick lime, chloride of lime, and the permanganates (Condy's fluid); these are destructives, and will no doubt destroy the poison if brought into actual contact with it, of such strength as not only to destroy the poison, but everything else which they touch, and therefore not likely to be of any practical efficacy, as fire would destroy any useless articles much more readily. The only use, then, of which they could be, would be to add to the evacuations of the body before being thrown away. Well, as to antiseptics and deodorisers, we have plenty of substances which are of immense value as such, chlorine, iodine, carbolic acid, &c., &c., but can any one say positively that they are disinfectants? From experiments made on vaccine virus he had come to the conclusion that they, when in a state of vapour, do not destroy its efficacy. A strong solution of carbolic acid has no effect on the egg-cases of lice. He would like to know on what grounds it can be asserted that they will act as disinfectants of other animal poisons, such as scarlet fever and small-pox. It is well known that in the parish of Marylebone, where the author of the paper is the energetic Officer of Health, and it is in fact admitted by him in his paper, that with all the means taken for the purpose of disinfection, and thoroughly carried out, cases of scarlet fever and deaths therefrom have not a whit decreased, but if anything increased. Moreover also, during the last three years it has never been absent from the parish. It cannot now be called epidemic, it is persistent. It is more than probable that equally good, if not better, results would have accrued if the same amount of care and cleanliness had been employed without the use of so-called disinfectants. Dr. Williams would, with much

diffidence, suggest that it is just possible that the substances enumerated may be actual preservatives, when not applied of such strength as to be actual destructives of the clothing and furniture as well as of the poison: that is, they may, by their antiseptic properties, prevent or delay the process of decay which fresh animal poisons, like other fresh animal matters, sooner or later undergo.

There was one substance to which he had not yet alluded, namely, the fumes of burning sulphur (sulphurous acid). Unfortunately this substance cannot be employed to its full extent so long as the invalid occupies the apartment; nevertheless, the room may be again and again partially filled with the fumes when occupied, provided a damp cloth be laid over the face. From the good effects he had seen produced by these fumes in greenhouses, he was induced to think highly of it. For the purpose of disinfecting a room after the removal of the patient, he would suggest sulphureted hydrogen. His reason for having more faith in the sulphur gases than in chlorine is, that the latter with its salts prevents putrefaction. It is a good antiseptic, but that by no means proves it to be a disinfectant, but otherwise; for by its property of preventing and removing the products of animal decomposition, it may prevent the destruction and decomposition of a fresh non-putrid animal poison; whereas the fumes of sulphurous acid and sulphureted hydrogen have no such properties. The latter in fact is one of the products of animal decomposition, as are also ammonia, phosphureted and carbureted hydrogen, and the presence of any one of these might naturally be presumed to hasten the destruction of fresh animal poison. Of course all have heard of the experiments made by Professor Halford on the poison of the rattlesnake; now if these experiments are confirmed by others, the fumes of ammonia, when applied to other animal poisons, might prove it to be the proper substance to be employed for disinfecting purposes. At any rate, it would be well if some carefully conducted experiments were made to prove the efficiency or non-efficiency of the various substances now recommended as disinfectants. And this might easily be done by exposing vaccine lymph to the different gaseous substances recommended; and then, by actual experiment, proving whether or not the virus was destroyed. At present we are not able to speak with certainty as to any substance being a disinfectant in the true acceptance of the term.

Dr. Ross said that the opinion expressed by Dr. Wynn Williams as to the uselessness of disinfectants was undoubtedly deserving of

attention ; but he thought more definition and analysis were required before the actual value, or otherwise, of disinfectants could be determined. There was, first, the difference between antiseptics and disinfectants to be borne in mind ; carbolic acid, which failed to arrest scarlet fever in Dr. Williams's house, was an antiseptic. His own experience of carbolic acid concurred with Dr. Williams's, and he had no confidence in carbolic acid as a destroyer of the poison of scarlet fever. He regarded carbolic acid as an uncertain, and, as usually employed, a weak agent for this purpose. Then chlorine was a disinfectant, and acted altogether in a different way from carbolic acid ; and the question was, could chlorine, although capable of breaking up chemical compounds, destroy organic poisons ? Dr. Williams's experiments seemed to show that it could not. This is a most important subject, and requires extended research. If Dr. Williams's opinions should be confirmed, no disinfectant would be left on which reliance could be placed, but a high temperature.

Dr. Ross would make the same remark as to the necessity of further analytical research in relation to the statement in the paper read by Dr. Whitmore, to the effect that zymotic diseases had not diminished since a sanitary system had been established in London. This might be a true, although a broad, statement ; still, we have yet to find out what results were due to specific causes ? This is the real and most important duty of the medical officer of health. Dr. Ross thought that it might be agreed that sewer poisons would produce typhoid fever ; but he should not expect to find scarlet fever, any more than small-pox, arise from that cause. The true value of sanitary science could not be made out until these and similar questions had been thoroughly examined. It was a great work, but until it was achieved no adequate opinion could be expressed on the utility of sanitary science, either in gross or in detail. The ventilation of sewers was a most interesting subject, and sufficient attention had not yet been given to it.

With respect to the sanitary system of the future which Dr. Whitmore wished to see inaugurated, Dr. Ross begged to say that the system desiderated was already in operation in all its main details, in the district of St. Giles's. The sanitary inspectors of St. Giles's called daily upon the parochial medical officers, and obtained information of every case of zymotic disease as it occurred. They called also at stated intervals at the Bloomsbury Dispensary, and obtained a similar report of the

new cases there treated. In the event of a disease threatening to be epidemic, private practitioners were also applied to. Thus an early knowledge of nearly all the zymotic diseases in the district was obtained. The inspectors then called at the houses, and issued the necessary notices for cleansing and disinfecting, and for the removal of patients, &c., leaving a copy of rules for the guidance of parents and householders. This system would be more complete if private persons were compellable by law to give information of all new cases of fever to the medical officer of health. Short of this, however, much good would be done if a similar system were in operation throughout the metropolis. As an evidence—to be taken for what it is worth, yet with a hope that it is worth something—of the utility of this system, it might be stated that last year, when scarlet fever was raging throughout London, the mortality in St. Giles's from this disease was only eighty-five per hundred thousand persons living, whilst in the surrounding central districts it was at least twice, and sometimes three times, as high. The ordinary mortality of St. Giles's from this cause was not, in fact, exceeded.

ON THE DIAGNOSIS AND TREATMENT OF AORTIC ANEURISM.

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IN treating of the subject of aortic aneurism, it is practically more useful as well as convenient to consider it under the two great subdivisions of thoracic and abdominal aneurism, in relation to diagnosis at least, while the treatment of both may be included under one head.

THE DIAGNOSIS OF THORACIC ANEURISM.

Sufficiently obscure at times, at others the diagnosis of thoracic aneurism seems so patent that it is difficult to conceive the possibility of a mistake, yet, even in cases apparently the most simple, mistakes are not only possible but are occasionally made even by men of considerable experience, not only as to the nature of the affection, but quite as frequently as to its seat; aortic aneurisms being not infrequently sent to hospital to be ligatured, a procedure of course inadmissible.

I need hardly say what an aneurism is, that it is a local dilatation of an artery, of all its coats uniformly in a fusiform or globular shape, or a bulging of these coats to one side or the other, these two forms being often united in the thoracic aorta, in which uniform dilatation is frequently associated with local bulgings. The form caused by uniform dilatation of all the coats is termed *a true aneurism*. The bulgings are, however, frequently entirely local and circumscribed, unaccompanied by any general arterial dilatation, but on the other hand accompanied and apparently produced by rupture of one or other of the arterial coats; this is what is termed *a false aneurism*. It is frequently also called *a sacculated aneurism*; but it is well to remember that this term is

also occasionally applied to the bulgings already described as occasionally associated with uniform dilatation, especially when these are unilateral. During life it is not always possible to state, even with any amount of probability, whether a sacculated aneurism is true or false; but it is usually possible to say, with great probability, whether it is associated with dilatation of the vessel, and therefore probably a mere bulging, or whether it stands alone, and is therefore all the more likely to be not only a sacculated but also a false aneurism. These false aneurisms have been also pathologically subdivided into several varieties, according to the number and nature of the coats ruptured: clinically this is a matter of no importance, and impossible to recognise. So-called *dissecting aneurisms* are those in which the two inner coats are ruptured, and the blood effused between them and the outer coat. The accurate diagnosis of this event is not always easily made; fortunately it is of slight importance in relation to treatment, though of some consequence to prognosis. *Varicose aneurisms* chiefly affect the arch of the aorta, and consist of anormal communications between it and the superior vena cava, the pulmonary artery, and the right auricle. These give rise to phenomena of great pathological interest, but are usually rapidly fatal, and therefore form no subject for treatment. *Cirroid aneurism* of the aorta, or what is called so, is by no means rare, at least if we take Rokitansky's definition of this form. He says that any cylindrical or fusiform dilatation of the artery, if accompanied by apparent increase in length of the vessel, and by bulgings first on one side and then on the other, so that the vessel winds, as it were, from side to side, and lies in apparent coils, is entitled to this appellation.* A great number of what are termed true aneurisms of the thoracic aorta present this appearance, and are therefore entitled to be called cirroid, though they have nothing in common with the external so-called aneurisms usually recognised by this term.

Again, when we speak of aneurisms of the aorta we usually refer to those occurring above the semilunar valves, but it would be wrong to regard them as the only aneurisms of the aorta. For besides aneurisms of the valves themselves—which possibly ought to be looked upon as actually belonging to the aorta, and which, when they reveal themselves clinically at all, do so only as lesions of these valves—we have also, though only very rarely, aneurisms

* "Handbuch der Pathologischen Anatomie." 1844. II. Bd., s. 551, 577

situate immediately within the valves and above the cardiac ventricle (intravalvular aneurisms) and aneurisms between the valves (intervalvular aneurisms), the latter being much the most rare; but both forms are exceedingly uncommon.* The symptoms during life, so far as observed, were only those of valvular lesion; clinically, therefore, they possess no peculiar interest, though they are of considerable pathological importance.

True aneurisms, therefore, simple dilatations of whatever form, accompanied or not by bulgings, and false or saccular aneurisms, arising above the valves, are those of the greatest clinical importance, and they are much more frequent in the thoracic aorta than in any other part of its course. This we learn conclusively from Dr. Sibson, who, at a great deal of personal trouble, has collated the records of 584 cases of aneurism, and also examined 296 specimens in museums, to which no histories are attached—880 cases in all.† From his researches the following table has been compiled:—

Situation of Aneurism.	Total Number.	Of these there were Sacculated.	Mere Dilatation of Vessel.	Character of Aneurism not defined.
Sinuses of Valsalva	87	95.95	3.56	
Ascending Aorta	141	54.75	38	7.25
Do. Dissecting Aneurism	52			
Transverse Aorta	120	44.25	20	12.5
Ascending and Transverse Aorta conjointly	112	40.7	85.7	
Descending Portion of Arch	72	71.9	14.55	17.7
Transverse and Descending Portion of Arch..	20			
Whole Arch	28			
Descending Thoracic Aorta below Arch	71	42.4	42.55	20.4
Abdominal Aorta at Cœliac Axis	131	70.35	11.85	18.4
Abdominal Aorta below Mesenteric Artery	26			
Branches of Abdominal Aorta	20			

* Vide three cases, two of the former and one of the latter form, related by Rokitsansky, in the "Medizinische Jahrbücher," s. 174. Wien, 1867.

† "Medical Anatomy." London, 1869. Churchill & Sons. Columns 57 & 58.

Thus of 880 cases, no fewer than 703 belong to the thoracic aorta, and if we take any one portion of its course we find that by far the largest number of aneurisms belong to the ascending aorta, which includes no fewer than 193, 52 of them being dissecting aneurisms. The transverse portion of the arch is much less frequently involved, its aneurisms numbering only 120 out of the 880, while aneurism of the descending portion of the thoracic aorta is still more rare, only 72 out of the 880 belonging to that portion of the artery. Further, if we take the number of aneurisms belonging to the ascending portion of the aorta and to its transverse portion conjointly, and compare them with those arising from the transverse and descending portion of the arch conjointly, we find the relative numbers to be 112 and 20. All these facts tend to show the very great importance of the ascending portion of the aorta in relation to aneurism; and the cause of this is not far to seek: it is purely mechanical, and arises from the strain of the impulsive action of the heart being necessarily most felt in this situation, on account of the relation of this portion of the artery to the left ventricle, the fact that the relative frequency of atheromatous degeneration of the vessels is greatest in this situation being unquestionably secondary. It is always the part that is weakened or overtaxed that yields most readily to disease, it is the *pars minoris resistentiæ*, and though atheroma frequently precedes and favours the production of aneurism, especially of sacculated aneurism, it is not necessarily a precursor of aneurism, and may be regarded as directed to this situation by the same cause which regulates the relatively frequent development of aneurism there. But to enter more fully into pathological and physiological details would occupy too much of both time and space, and is also foreign to my present object.

There is no disease the diagnosis of which is more beset with difficulties than thoracic aneurism, but there is also probably none in which a due consideration of all the physical signs and symptoms, as well as of their modification by position, exertion, &c., and of the mode in which they have been primarily developed and have subsequently progressed, is more capable of conducting us to a satisfactory, if not always a perfectly positive, diagnosis. There is only one phenomenon positively characteristic of thoracic aneurism, and that is *the existence in some part of the thorax of a pulsating tumour other than the heart, which beats isochronously* with it and*

* In certain rare instances the pulsation, though truly aneurismal, is yet not isochronous, vide CASE XXII., but this does not invalidate the above statement.

at least as forcibly, and which at each pulsation expands in every direction. These signs distinctly recognised are sufficiently distinctive, and yet they are occasionally so efficiently simulated as to necessitate great care in their determination as well as recourse to subsidiary assistance. A solid tumour lying on the aorta may give rise to a bruit, and may apparently pulsate, but it only rises and falls with the beating of the artery, and does not expand in every direction. A vascular tumour, be it mediastinal or pulmonic, similarly situate, may possess not only a bruit but also a certain degree of expansive pulsation; that pulsation, however, is not *isochronous* with the heart's action, but always somewhat delayed. An empyema may present both bulging and expansile pulsation isochronous with the heart, and, when subcutaneous or when more truly intra-thoracic, may efficiently enough simulate an aneurism; in these cases, however, the pulsation, though expansile from being communicated through fluid, is less forcible than that of the heart; there is also absence of thrill or murmur, with the existence of the other signs and symptoms as well as history of an empyema.* Quite recently I have seen four cases in which aneurism of the sinus of Valsalva was simulated so efficiently, except in the one characteristic of the pulsation being less forcible than that of the heart, as to deceive myself wholly in two cases, and for a time in one of the others, and also to deceive all those who saw them. Similar cases have not hitherto been recorded, so far as I know, therefore I make no apology for relating them.

CASE I.—William Macleod, aged thirty-two, formerly a soldier, now a van-driver, was admitted into Ward V. of the Edinburgh Royal Infirmary on 20th May, 1870. He complained of an occasional beating in the left breast, followed by great breathlessness, apt to be brought on and increased by exertion. While in India as a soldier some years previously, he had been laid up for a month with what appeared to have been, from his description, an attack of rheumatic fever; he also had syphilis there about fourteen years ago. His pupils were natural; his radial pulses slightly unequal, the left being a shade smaller than the right; the humeral pulses did not, however, vary. On percussing the cardiac region transversely in the nipple line, (along the upper edge of the fourth rib,)

* Vide an interesting paper by Dr. McDowall in the "Dublin Quarterly Journal" for March, 1844, on The Diagnosis of Empyema, especially at page 16, where the differential diagnosis of pulsating empyema and aneurism is considered.

dulness was found to extend for about an inch and a half from the left edge of the sternum to within half an inch of the nipple. On percussing longitudinally from the clavicle downwards, one inch from the left edge of the sternum, dulness was found to commence at the superior margin of the second rib, and to extend down to the liver dulness (left lobe). The apex beat was between the fifth and sixth ribs and just below the nipple. Between the second and third rib on the left side the dulness extended for rather more than an inch from the left edge of the sternum, and within this space pulsation was to be felt—less forcible, however, than that of the heart. On auscultating over the apex, a loud rough murmur was heard just preceding the apex beat, up to which it ran—a presystolic murmur occupying the time of the auricular contraction; the first sound was not pure, but there was no systolic murmur audible at this point; the heart's action was regular. Between the second and third ribs on the left side a loud and somewhat rough systolic murmur was audible, closed by an accentuated second sound; this murmur was propagated down to the fourth rib on the left side, and also across the sternum to the space between the second and third ribs on the right side, where the aortic valves were heard to close with decidedly less force, comparatively. This systolic bruit became always very faint and occasionally inaudible on the patient assuming the erect posture, the presystolic bruit remaining unchanged. The diagnosis was mitral contraction, and probably aneurism of the ascending portion of the aorta arising just above the valves, the latter portion of the diagnosis being based on the existence of a pulsating tumour with dulness between the second and third ribs on the left side, over which a loud rough systolic bruit was audible, followed by an accentuation of the second sound in that region much greater than that usually heard in cases of simple mitral contraction. There was no reason to suppose that the systolic bruit was of mitral origin, propagated upwards by convection; the possibility of this was duly considered, and rejected, because of the entire absence of any such murmur in its usual position, and also because of its exceedingly loud and rough character, and its wide area of propagation. The "probably" was added because so many similar cases had been seen of late that it appeared either that aneurisms in this situation were more common than is usually supposed, or that there was some fallacy in the diagnostic signs, and I was inclined to hold the latter opinion. He was discharged, greatly improved, on the 20th of July. Previous to his

discharge he was seen by Professor Sanders, who confirmed the diagnosis, especially as to the possibility of its being a case of aneurism. On the 16th of October he was re-admitted, complaining of irregular attacks of ague, which he had formerly suffered from in India; he had been taking arsenic for a week, in full doses, without benefit. He was ordered five grains of quinine every two hours, and under this treatment he rapidly improved. On the evening of the 27th of October he had a rigor, followed by fever and a restless night; on the 28th he was feverish, with quick respirations, rusty gelatinous sputum, fine crepitation over the right lung posteriorly; no dulness. On the 29th he was much feebler, respiration 60, otherwise as yesterday; and in spite of free stimulation he died at three p.m.

Autopsy.—November 1st. On opening the thorax the left lung was seen to be retracted upwards and backwards, receding from the mesial line opposite the second and third ribs; it dipped down opposite the fourth and fifth ribs, leaving uncovered the whole of the right ventricle, the apex and lower half of the left ventricle, and to a slight extent the pulmonary artery also. Amount of serum in thoracic cavity normal. The heart weighed nineteen ounces and a half, and was hypertrophied and slightly fatty. The pulmonary and tricuspid valves were healthy. The cusps of the aortic valves were thickened and slightly incompetent; the mitral valve was much thickened, especially its aortic segment. The auriculo-ventricular orifice on the left side was so contracted as only to admit the point of the little finger. There was some cretaceous deposit at the junction of the auricle and ventricle; the cordæ tendineæ of the mitral valve were thickened; the aorta healthy. Both lungs were deeply congested, and floated heavily, especially the right one, but neither were properly speaking hepatized. The liver weighed four pounds, and presented an indistinct nutmeg character; its capsule was healthy. The kidneys were pale and fatty, the cortical part increased one-third in volume, the capsules free, the surface beneath smooth. The spleen weighed two pounds one ounce and a half; it was softened, and on section presented a few hæmorrhagic spots varying from the size of a shilling downwards.

The autopsy, while thus confirming the diagnosis in every other point, gave no support whatever to the idea of an aneurism, not a trace of this having been observed: but for this I was fully prepared by the previous occurrence of the following still more remarkable case:—

CASE II.—James Morrison, aged thirty-one, a bricklayer, admitted to Ward V. on April 25th, 1870, complaining of soreness in the chest, headache, dyspnœa, and some swelling of the face and body generally. I shall omit the general history of the case, which was that of an ordinary case of Bright's disease, merely premising that though by no means anæmic, he was of a somewhat sallow complexion, and that the dropsy present was merely an inconsiderable amount of general anasarca depending upon an early stage of cirrhosis of the kidney, with slight traces of amyloid degeneration, as ascertained by inspection after death. He was a powerfully-built man, with all his other organs and functions in perfect health and normal, with the exception about to be mentioned. His pupils were both equal, and both pulses equal at the wrist. The apex of his heart beat between the fifth and sixth ribs, just outside the nipple line, and was somewhat diffuse. Cardiac dulness extended longitudinally one inch to the left of the sternum, from the lower edge of the second rib to the liver dulness, and transversely in the nipple line (along the upper border of the fourth rib) from the left edge of the sternum to the left nipple, a distance of three inches. Between the second and third ribs on the left side there was an evident pulsation, which was most distinctly perceived on deep expiration. This pulsation extended for three quarters of an inch from the edge of the sternum and ended abruptly; dulness in this situation, however, extended to the left for quite two inches, but scarcely encroached at all upon the sternum. Upon auscultation the first sound over the apex was rather feeble, but distinct and without bruit, the second sound was somewhat accentuated. At the right edge of the sternum, between the second and third ribs, the first sound was still heard somewhat feeble, but free of murmur, while the second was more markedly accentuated, and this accentuation increased as the stethoscope was moved across the sternum, till it attained its maximum over the dull pulsating tumour already described; and here—that is between the second and third ribs on the left side—it was preceded by a specially loud and rough systolic bruit, very well marked and distinct, and presenting none of the usual characteristics of a purely hæmic murmur. A trace of this bruit could be heard over the innominate and right carotid arteries, but not even a trace was audible over any of the other vessels, though the accentuation of the second sound was more or less distinctly heard in both subclavian and in both carotid arteries. It is impossible to conceive any objective symptoms which could more closely resemble those of

an aneurism arising from one of the sinuses of Valsalva and passing to the left, with this only proviso, that the pulsation was fainter than the apex beat, and I am not certain that this can be under all circumstances accepted as efficient negative evidence. Subjective symptoms relating to either aneurism or cardiac disease were entirely absent; their absence, however, is certainly not efficient evidence of the non-existence of an aneurism, though it certainly would have thrown a halo of suspicion around any case with symptoms less well marked than this one appeared to possess.

This patient was unfortunately seized while under treatment with an acute attack of erysipelas of the head, of which he died on the 29th of June. At the autopsy, on the 1st of July, the left lung was found to be somewhat retracted, leaving the upper part of the heart and pulmonary artery rather more uncovered than usual. The aorta was found to be very slightly dilated, but the heart itself was, with the exception of a slight enlargement of the left ventricle, normal in every respect, the pulmonary artery was perfectly normal, and its valves healthy. The interior of both the aorta and pulmonary artery and their chief branches was perfectly smooth and wholly free from every trace of atheroma.

In spite of the care with which the possibility of the signs in the first case depending upon the propagation upwards of a systolic mitral bruit was considered, and the cogent reasons for which this idea was dismissed, I confess that had that case occurred alone, few probably would have agreed with me. The occurrence of this second case, however, in so far confirms my view, as it proves that similar symptoms may be observed in cases in which no mitral complication, indeed no cardiac complication whatever, exists. The very interesting relation of these cases to the diagnosis of aneurism arising just above the aortic valves and passing to the left side is obvious; indeed, if we except the absence of cardiac pain and the comparative feebleness of the pulsation, I know of no symptoms capable of distinguishing between similar cases and those of aneurism in this situation, and even those are uncertain. Pain does not always exist, even though aneurism be present; and feebleness of pulsation compared with that of the heart is a sign to which attention has not, so far as I know, been hitherto directed, and data as to its trustworthiness are therefore wanting. As to the cause of the signs in these cases, it will be observed that both agree in one point—viz., the retraction of the left lung. The pulmonary artery being thus left bare, its pulsation is readily felt, and its natural

dulness is not obscured; hence the apparent existence of a dull, pulsating tumour in the second interspace. From being close to the surface its valve sounds are also heard more distinctly than usual, and therefore appear accentuated, when they are not so, from other causes; while the systolic bruit appears to be produced by the ventricular contraction doubling up and compressing the pulmonary artery against the ribs by a force which in the natural condition is wholly expended in separating the two lungs, and pushing outwards and backwards the left one, aided no doubt occasionally by the existence of a spanæmic condition of the blood, which doubtless existed in both of the cases related, caused in the one by the albuminuria, and in the other by the co-existence of ague and cardiac cachexia, though neither of them appeared to be actually anæmic. The efficiency of this cause in producing murmurs in this situation has been proved by Dr. Quinke of Berlin, who has shown that systolic bruits are produced in this situation apparently in the manner related, whenever from any cause, either disease or defective respiration, the left lung is retracted, and that they cease when the lung returns to its normal volume, as proved by the increase of the size of the left half of the thorax by a few centimetres, and by a simultaneous decrease of the absolute cardiac dulness.* This view is also to a certain extent confirmed by the disappearance of the bruit in the first case when in the erect posture, which may be regarded as produced by the counteraction of the heart's weight in preventing the necessary compression of the pulmonary artery against the ribs. There can be no doubt also that the dilatation of the aorta in the second case, though too slight to reveal itself to percussion, was yet quite enough to produce some accentuation of the aortic second sound, which being propagated along the aorta and its main branches in the neck, was distinctly enough recognised to be of aortic origin. And this fact coupled with the greatly increased intensity of this sound over the pulsating tumour to the left, as well as the peculiar roughness of the bruit which preceded it, led me to have no doubt as to the existence of an aortic aneurism in this case, as these are the very objective signs by which it would reveal itself if present. The somewhat faint propagation of the systolic bruit to the right over the innominate and carotid arteries seemed also to confirm this view, but

* Beiträge zur Entstehung der Herztöne und Herzgeräusche, von Dr. H. Quinke. "Berliner Klinische Wochenschrift," Mai 1870, No 21. Vide also "Edinburgh Medical Journal" for January 1871, p. 667.

in itself this propagation is of no value, because I have repeatedly observed purely hæmic bruits to be occasionally propagated in this direction, though I am quite unable to give a reason for it. Indeed, there is no subject more puzzling than the mode of origin and of propagation of bruits originating in the large thoracic vessels, and of this there could hardly be a more striking instance than the following :—

CASE III.—Mary Macmurray, aged thirty-one, admitted into Ward XIII. on May 26th, 1870, complaining of great pain across the chest, loss of appetite, and general debility. She stated that she had never been very robust, and had suffered from acute and sub-acute rheumatism on three separate occasions; the first of these attacks occurred nine years, the second seven years, and the third three years ago. She also suffers almost constantly from chronic rheumatic pains of her limbs and chest. Towards the close of her first attack her heart was affected. About ten months ago she began to get more feeble, and lost her appetite, suffering also from severe pains in the precordial region, since which time she has gradually got worse. Her urine was found to be albuminous, having one-fourth of albumen, specific gravity 1·016, acid, normal in quantity, and containing epithelial, granular, and hyaline casts. The kidney affection was her more serious ailment, and was that of which indeed she ultimately died; but in relation to our present subject her thoracic symptoms were by far the most interesting, and were as follows:—Her pulse was 104 and feeble, both radial pulses alike, and both pupils normal. The heart's apex beat behind the fifth rib, as ascertained by percussion, and two inches and a quarter to the left of the sternum. One inch from the left edge of the sternum the percussion sound was quite clear from the clavicle down to the upper edge of the second rib; from the upper edge of the second to that of the third rib the sound on percussion was comparatively dull, and perfectly dull from the upper edge of the third rib to the lower edge of the fifth, where the tympanic stomach sound came in. Along the upper edge of the fourth rib complete dulness extended for a distance of half an inch from the right edge of sternum to two inches and a quarter from its left edge, and comparative dulness for nearly one inch more. Along the lower edge of the second rib the dulness extended for a distance of two inches and three quarters from the left edge of the sternum. In this dull portion, between the second and third ribs on the left side, distinct pulsation was to be felt; less

forcible, however, than that of the heart. On auscultating over the apex beat a distinct presystolic bruit was usually, but not always, audible; the systolic sound was obscured, roughened, and occasionally replaced by a soft blowing murmur; the second sound was followed by a loud musical diastolic murmur. Between the second and third ribs on the right side the first sound was heard muffled, and there was a considerable accentuation (sharpness) of the second sound, followed by a diastolic murmur. Between the second and third ribs on the left side, close to the sternum, the second sound was more markedly accentuated, and the diastolic bruit more distinct; a little further to the left the same sounds were heard, and a distinct sense of pulsation was conveyed to the ear by the stethoscope. The accentuation of the second sound and the diastolic bruit were, however, most distinct immediately behind the sternal edge of the second rib at the left side. Into the left subclavian the accentuation of the second sound was distinctly propagated, but not the bruit. Into the left carotid both sounds were propagated, but not distinctly. Into the right carotid and subclavian both sounds were distinctly propagated. On auscultating up the right edge of the sternum the second sound and diastolic bruit were heard gradually to increase in loudness to the upper edge of the sternum, where it was joined by the first rib, but nowhere on the right did they attain the same loudness and distinctness as on the left. A slight humming murmur was occasionally audible in the veins. For the last month the patient's urine became more scanty; uræmic vomiting and sickness were frequent, and she gradually sank and died on the 21st December, the immediate cause of death being a pleuro-pneumonia, absolutely latent, and entirely without any subjective symptoms whatever. Her cardiac symptoms remained unchanged.

At the autopsy, on December 23rd, the lower part of both the right and left lung were found to be hepatized, and were covered externally by a thin layer of perfectly recent lymph, presenting a honeycomb appearance. The left lung was slightly retracted, uncovering the heart to a greater degree than usual. The heart itself was purse-shaped and somewhat enlarged, its substance healthy; the aortic valves were competent, but its cusps were thickened, and covered over their whole under-surface by numerous vegetations; the mitral valve was thickened and contracted, scarcely admitting two fingers, and with some threads of recent lymph attached to its edge; the upper surface of

the aortic segment of this valve was thickly studded with rough stumpy vegetations of varying size. The liver was healthy. The spleen weighed fifteen ounces, and on its posterior border had seven hæmorrhagic infarctions of a triangular shape, and varying from the size of a pea to that of a small bean (the results of embolism); otherwise it was healthy. The kidneys were slightly enlarged; the right weighed five, and the left six ounces; the cortical substance was lessened; the capsule was natural, and when peeled off exposed a smooth organ. The intestines were congested, and the rectum and lower part of sigmoid flexure of the colon were thickened.

Now, the first thing that strikes us in regard to this case is, that it in many respects presents the exact counterpart of the two cases just related, with this exception, that the bruit was not systolic but diastolic. It may be asked how I could be so certain of this character, seeing that the pulse was at 104—a rate at which what is diastolic and what is systolic are not very readily distinguished. But being perfectly aware of this, the utmost care was taken, and the distinctly diastolic character of the musical bruit was most clearly ascertained by slowing the pulse to 80 by means of the recumbent posture and of digitalis. The case is copied from notes dictated at the time, and may be thoroughly relied upon as correct. Had the murmur been systolic I should of course have referred it at once to the same category as the preceding cases; but with a diastolic murmur audible in such a situation I fancied myself shut up to the diagnosis of aneurism. The murmur was distinctly diastolic in time, and occupied the very first portion of the diastole, never running into the presystolic murmur, from which it was separated by an evident pause. It is difficult to account for this murmur; the only solution which seems to me feasible is that the spanæmic blood, rushing over the rough nutmeg-grater-like aortic segment of the mitral valve at the moment of the diastole, to fall into the now open ventricle, produced this loud musical murmur, which so lessened as to become inaudible as the ventricle filled, just as the water rushing through a sluice into a pond ceases to make so much noise as the pond fills. The period of rest then remained soundless, and the auricular contraction produced only the ordinary presystolic bruit, not reproducing this musical sound, because from the tense condition of the valve stretched across the auriculo-ventricular opening, and the direction of the auricular force, the sonorous vibrations were produced by the blood being

forced through a narrow opening, and not as during the diastolic period by its forcible impingement upon a vibrating valve, roughened by innumerable vibrating papillæ. However we may regard this murmur as produced, the case is certainly a most instructive one, especially so as showing that dulness and pulsation between the second and third ribs on the left side need not be aneurismal in character, even though the accentuated second sound be followed by a diastolic murmur. This case presents also a further illustration of the readiness with which murmurs originating in this situation pass to the right, to the innominate and right subclavian and carotid arteries, and the difficulty with which they are propagated to the left, as I have already pointed out; the reason for which is not, however, very evident. I believe that similar cases, at all events those associated with a systolic murmur on the left of the sternum, are by no means infrequent. But cases of a similar character occurring on the right side must, from the ordinary position of the parts, be extremely rare. I therefore consider myself fortunate in being able to illustrate the difficulties attending the diagnosis of aneurism in the case of a patient presenting a pulsating tumour between the second and third ribs on the right side, by the following remarkable instance which has just occurred to me:—

CASE IV.—George Smith, a shoemaker, aged thirty-five, admitted to Ward V. on December 5th, 1870, complaining of breathlessness, cough, spit, and occasional hæmoptysis. When about sixteen years of age, while acting as a cattle herd, he was occasionally affected with slight rheumatic pains in the shoulders; but excepting a slight attack of ague (in Iowa, United States of America) about two years ago, he has not since had any rheumatism or other ailment except when about eighteen years of age, after having been two years engaged in shoemaking, when he suffered from loss of appetite, and occasional squeamishness and faintness; at that time, however, he was well fed, and was able to keep at his work. Just then, however, his thorax became gradually deformed by rickets, his spinal column having now a double lateral curvature, and being also so twisted in the lower dorsal and lumbar region that the transverse processes lie somewhat diagonally; the ribs are broad and flat, the upper ones apparently wider apart than usual, the lower ones (below the sixth) crowded together. The anterior part of the thorax is also so altered that the right side is round and prominent, while the left is flattened and compressed; the lower part of the sternum is also concave, as is usually the case in

cobblers. Both feet are twisted outwards, but he says they have been so from infancy.

About a year ago he began to have at times a severe pain across the front of his chest below the *mammæ*; this pain usually came on while stooping over his work, but at times when he was otherwise engaged, occasionally even when in bed, and this it did for two weeks at a stretch, compelling him continually to shift his position, and even to get out of bed. He does not think that any change of position gave relief. The pain came on suddenly, was not accompanied by any breathlessness, and it usually went away suddenly; he attributed it to the pressure of the boot on his breast, necessary in his trade.

About six months ago he first began to have shortness of breath, earliest felt on making any sudden movement, such as raising himself quickly from a stooping posture, but it speedily came to follow any exertion however slowly made, especially such as ascending a hill, &c. During last summer he had considerable cough, and in August when bathing he brought up some blood mixed with the sputa; this trifling hæmoptysis lasting one day only at this time. His cough now became worse, and six weeks later his hæmoptysis recurred, lasting three or four days. About a month ago he had a third attack of hæmoptysis, which lasted for three weeks.

On inspection of the thorax the points already pointed out are seen, and considerable heaving of the precordial region is also observed, the spaces between the fourth and fifth, and the fifth and sixth ribs, being retracted at every diastole. Between the fifth and sixth ribs lies the lowest point of cardiac pulsation to be seen or felt, the ribs beneath this closing up and almost overlapping each other, and extending down into the pelvis; but this is no apex beat, but a broad impulse diffused over a space of two inches and a half. The large arteries of the neck pulsate visibly with great force, and some thrill is felt at each pulsation. On laying the hand over the upper part of the thorax, a considerable amount of thrill is felt, chiefly towards the right edge of the sternum and along its upper border. On putting the finger into the tracheal fossa the aorta is felt pulsating within half an inch of the upper edge of the sternum. Between the second and third ribs on the right side a pulsating tumour is to be felt, extending for about an inch to the right.

On percussing on the left side, one inch from the edge of the sternum, the percussion note is found to be clear down to the

upper edge of the fourth rib, dulness extends from that to the upper edge of the sixth rib, and beneath this nothing is perceptible on percussion but the tympanitic note of the stomach. Dulness in the nipple line begins about one inch to the right of the sternum, and extends across for a distance of four inches and three quarters. Along the right edge of the sternum, from the upper edge of the second rib down to the liver dulness, for a distance of one inch to the right, the percussion note is dull.

On auscultating over the lowest part of the cardiac impulse, the first sound is heard somewhat muffled, and the second is replaced by a bruit. Between the second and third ribs at the right edge of the sternum a loud rough murmur replaces the first sound completely, and the second sound is also wholly replaced by a softer blowing murmur. Both of these sounds are louder and harsher over the pulsating tumour already mentioned, but become softer in character, though remaining equally distinct, on auscultating over the sternum. These bruits are propagated upwards into the vessels of the neck and across the sternum to the left. The pulmonary second sound is distinctly audible just over the left edge of the sternum, close to the second interspace, within which it is only faintly to be heard close to the sternum. The pulse is 86, full and jerking, and is also delayed, the radial pulse coming just between two cardiac impulses, and as nearly as possible equidistant from both. At present his cough is nearly gone, but he still has a slight amount of purely catarrhal expectoration. Other phenomena unimportant, either natural or without bearing on the case.

In this case the whole of the urgent symptoms and signs are those of incompetence of the aortic valves, phenomena which must be extremely rare when the disease is mainly of the nature of a sacculated aneurism just above the valves, and which I have never observed in such cases, in which, according to my experience, the symptoms are never cardiac, even though some of the signs are those of aortic incompetence; and I refer mainly to the bruits—for where the disease has originally been a sacculated aneurism of the aorta, the heart is rarely much implicated, even after the signs of aortic valvular incompetence have been superadded. Further, the signs present—especially the comparatively slight amount of dulness to the left of the sternum, and the greater amount of dulness to the right, and especially the fact that the pulmonic second sound is scarcely audible at all to the left of the sternum, and only becomes

so after we have placed the stethoscope upon that bone,—all point to the great probability that the heart has been slightly dislocated to the right,—a fact which if correct would of itself sufficiently explain the appearance of a pulsating tumour between the second and third ribs on the right side, extending not more than one inch from its right margin, as this is just the situation in which the aorta might be expected to appear in such a case. The probability of this being the source of the pulsating tumour is further increased when we find, from the increased dulness across the upper part of the sternum, and the feeling of pulsation in the tracheal fossa, that the transverse portion of the aorta is dilated, because all experience teaches us that in a case of aortic incompetence with a dilatation of the transverse portion of the aorta, dilatation of the ascending portion is almost certain to co-exist. Even without any dislocation of the heart to the right, therefore, the dilatation alone is sufficient to explain this pulsating tumour. Coupled with it, the evidence in favour of this tumour being simply the aorta, and not a sacculated aneurism, is so strong as scarcely to be gainsaid, and there is certainly no evidence deducible from the signs, symptoms, or history of the case, capable of controverting this diagnosis. In spite, therefore, of the absence of an autopsy in this case, I have thought it worthy of being recorded, as an example of a localised pulsating tumour on the right, not aneurismal (saccular) in character, and presenting in many respects the complement on the right side of those cases I have just recorded as having occurred on the left. The lung has also unquestionably been displaced in this case, and the proximity of the aorta to the walls of the chest is undoubtedly the cause of the greater loudness and roughness of the bruit over the tumour than over the sternum. The slight displacement of the heart is probably caused by the deformed condition of the chest due to rickets, the base of the heart being more displaced than the apex, as if the enlarged heart, resting on the diaphragm in this deformed and stunted body, leant somewhat forward and to the right into the bulging right half of the thorax; and this I have no doubt it does.

I had written thus far in relation to this most interesting case, when, by one of those sudden accidents so common in similar cases, he died on January 1st, 1871, apparently from œdema of the lungs, possibly complicated by pulmonary apoplexy, a phenomenon I have scarcely ever found absent in cases of sudden death from aortic regurgitation. A proper examination of the body was refused by the friends, but we were nevertheless enabled to ascertain with

perfect certainty that there was no saccular enlargement of the ascending aorta, and as that was the only point admitting of doubt this case may be accepted with confidence as the complement of those already related. Unquestionably much rarer,* because such a case can only occur by a combination of abnormal conditions, it presented in the second right interspace phenomena which must be much more common in the same position on the left of the sternum, and which must effectively simulate aneurism in this situation in presenting a circumscribed dull pulsating tumour transmitting a single or double bruit, which is nevertheless not saccular in character, and which though certainly arterial, need not necessarily be connected with even dilatation of the artery. The importance of these cases in relation to the diagnosis of aneurism in this situation is sufficiently evident. The points of resemblance are also quite apparent. The points in which they differed are—first, in the entire absence of all the subsidiary phenomena dependent upon pressure on the neighbouring organs, phenomena which do not always exist, and to the consideration of which we shall presently recur; and, secondly, in the fact of the isochronous pulsations being less forcible than those of the heart. That aneurismal pulsations are usually more forcible than those of the heart is a diagnostic point to which no attention has hitherto been paid. It first occurred to myself as a matter of some consequence in the diagnosis of aneurism in relation to the cases just narrated, as well as others of a similar but less delusive character. On talking the matter over with Dr. Henderson, late Professor of Pathology in the University of Edinburgh, a distinguished authority on the subject and himself a sufferer from the disease, I found that this had also struck him as an important point in relation to the diagnosis of aneurism close to the heart, and he believed he had pointed it out in his writings. I have, however, been unable to discover any reference to it in them. On the other hand, various writers on the subject, among whom I may mention Dr. Greene,† have referred to it as a

* At this moment, March 1871, I have under my care in Ward XIII. an apparently similar case in a female. In her there is a similar twisting of the spine and thorax; her heart is, however, displaced upwards as well as to the right, so that the pulsating tumour with a loud double bruit lies just beneath the first rib. There is also in this case an irregular innominate artery coming off from the left side, and passing across the lower part of the trachea to reach the right side.

† Vide his paper on The Symptoms and Diagnosis of Thoracic Aneurism, in "The Dublin Journal of Medical Sciences," 1837, pp. 233 and 236.

remarkable fact, without giving any reason for it, or any estimate of its diagnostic importance. Other writers, however, in narrating cases of indisputable aneurism, have mentioned that the pulsation in the sac was less distinct than that of the heart. The explanation of this discrepancy is, I believe, not far to seek: in order that the law I have mentioned (if it be a law as I believe) may hold good, the pulsations must be fluid; if the sac be lined with fibrine, other elements are introduced which neutralise those in force when fluids only are concerned. In substernal aneurisms—those close to the heart—this condition is, however, rarely present, and thus the physical conditions upon which this law depends usually remain in force just where it is of most importance that they should. The matter is one which can be proved by a calculation of the force concerned and a consideration of its mode of application, into which I have at present neither time nor space to enter, and depends upon a reversal of the well-known law of physics, that what is gained in space is lost in energy.*

Wherever, therefore, we have a tumour in the chest which pulsates isochronously, and at least as forcibly as the heart, we have certainly to do with an aneurism, which, if it does not now present, has probably at some previous period presented other subjective symptoms, of which pain is that most apt to disappear during its progress (CASE XXI.); the signs of pressure, on the other hand, are more constant and more likely to increase, if we except the signs of pressure on the brachial veins, which may entirely disappear as the aneurism progresses (CASE XXVII.)

PAIN is a symptom which is most apt to be loudly complained of, yet inasmuch as it may arise from neuralgia (rheumatic) of the external coverings or from angina, it is not of itself much to be depended upon as a sign of aneurism; and therefore while it ought always to direct our attention to the parts, as it must necessarily do, it can never of itself be accepted as an efficient diagnostic sign of aneurism, though we may often find it to be a valuable warning. The pain of commencing aneurism will always be found to be more neuralgic and lancinating in character, as well as more continuous, than that of angina, but not usually so dreadfully oppressive and depressing; ranking with neuralgic pain in this, that it often disappears for months without any very obvious

* "Lessons in Elementary Physics," by Balfour Stewart, London, 1870, p. 114.

reason. When the aneurism affects the large vessels at the root of the neck, or the aorta in this situation, the pain shoots across the chest as well as up the one side of the neck, or down one arm, or extends in both directions, sometimes shooting down both arms. When it affects the descending portion of the thoracic aorta it is usually referred to one spot in the back, where it is constant; though even in such cases violent stings may shoot up the neck or down the arms. But in such cases we have usually both circumscribed dullness and localized pulsation, with or without bruit, and usually other symptoms which serve to confirm the diagnosis. And it is chiefly in incipient substernal aneurisms close to the heart that pain is so isolated and important a symptom as almost to entitle it to be called "pathognomonic," as Dr. Greene has put it; yet a careful watching even of such cases will ere long elicit other symptoms which are more trustworthy and more truly pathognomonic of aneurism than pain alone, which is truly only an important warning, but a warning with a query. Pain in the situations referred to is chiefly produced by pressure on the intercostal nerves, or those of the brachial plexus, and a constricting pain around the lower part of the chest is occasionally produced by pressure on the phrenic nerve; pressure on the latter nerve also giving rise occasionally to attacks of dyspnœa, singultus, or even to complete paralysis of the diaphragm; while pressure on the pneumogastric, besides giving rise to disease of the lungs, in its earlier stages is frequently accompanied by vomiting, or severe dyspepsia, accompanied by flatulence, often relieved by gentle rubbing of the tumour.

DYSPNŒA is a very frequent symptom of aneurism, and it arises from compression of the trachea, one of the bronchi or a portion of lung, or of one of the recurrent laryngeal nerves. When one of the recurrent laryngeal nerves is affected, the dyspnœa may arise from spasm, or paralysis of the vocal cords. In the former case both the inspiration and the expiration are affected; in the latter the inspiration alone is impaired. The voice in such cases is altered (*vox anserina*, shrill whistling voice); more rarely there is complete aphonia; and inspection by means of the laryngoscope reveals on which side the affected vocal cord lies, and leads us to inspect with care the arch of the aorta in the neighbourhood of the origin of the left subclavian, or of the innominate artery, according as it is the left or the right cord that is affected; while if the glottis is found to open freely, and the arytenoid cartilages to retain their

normal movements, we know that any dyspnœa present is not laryngeal in its origin, and probably depends upon compression of the trachea or one of the bronchi. When the respiration is found to be diminished equally on both sides of the chest, we are justified in regarding the trachea as the part compressed, and in such cases the transverse portion of the arch is usually at fault; though the trachea may be compressed, exceptionally, by aneurisms both of the ascending and descending aorta. On the other hand, compression of one of the bronchi gives rise to diminution of the air in that part of the lung to which it is distributed, over the whole of the one lung if it be one of the main divisions, over the corresponding part of the lung if it be one of the smaller bronchi. This diminution of the air in the lungs gives rise to a higher and more tympanitic note over the part affected,* and it may give rise either to diminution of the respiratory murmur over the corresponding part of the lung, or more rarely to bronchial respiration,† which is a very remarkable phenomenon when associated as it is in such cases with a clear tympanitic percussion note. Dyspnœa arising from aneurismal compression of the trachea or bronchi is naturally increased by exertion, and frequently much relieved by posture, as by leaning forward when the pressure is on the trachea, or leaning to one side when one or other of the bronchi is affected. In such circumstances the air is heard to enter more freely than under the ordinary conditions, and thus postural aids to diagnosis are often of service in ascertaining the exact position of the aneurism. But dyspnœa may also arise from pressure on the lung itself; it is then frequently associated with symptoms simulating phthisis, and for these alone the patient occasionally seeks relief wholly unconscious of his actual malady (CASE XXIV.) Still more rarely the dyspnœa is brought about by compression of the pneumogastric nerves, which may either give rise ultimately to serious and fatal lung disease, (CASE XVII.,) or may of itself prove fatal by producing suffocation. Of all the organs within the chest, the lungs are those most frequently compressed by aortic aneurism, and this is the reason why a circumscribed dull patch is one of the most frequent symptoms of this affection.

* Skoda. "Abhandlung über Perkussion und Auskultation," Wien, 1844, s. 18.

† Vide a Case of Dr. Halliday Douglas, "Edinburgh Medical Journal," December 1869, p. 550. Dr. Greene, loc. cit., p. 233. And for an explanation of this phenomenon, vide Skoda, loc. cit., s. 108.

COUGH is a very frequent symptom of thoracic aneurism, and as it arises most frequently from irritation of the pneumogastric and laryngeal nerves, it usually presents certain peculiarities, which, if not exactly pathognomonic, are at least sufficiently striking to excite attention. In such cases the cough is often loud and barking, or accompanied by metallic clang (CASE XXIII., &c.) The cough is very distressing both to patient and observers, and appears far in excess of the necessities of the case, being accompanied, at first at all events, by only a small amount of glairy and frothy mucus. From persistence of the irritation the expectoration may, however, become more copious, and muco-purulent. When, however, the cough arises from pressure on the lungs themselves, the expectoration is always copious and muco-purulent, and simulates that of phthisis (CASE XXIV.) At times it may become rusty, or even red (CASE XXIII.), and then betokens a very hazardous condition of the aneurism. At others, in that variety which is termed weeping aneurism, the expectoration, without being copious or even accompanied by much distressing cough, always contains some small amount of fluid blood (CASE XXIX.)

DYSPHAGIA is also a common symptom of thoracic aneurism, and this varies in extent from slight difficulty in swallowing, arising apparently from some interference with the œsophageal innervation, to that more complete form of dysphagia arising from compression of the œsophagus in which there is either great difficulty in swallowing solids, or complete inability to do so (CASES XVIII. and XXIII., &c.) The differential diagnosis between this form of dysphagia and that arising from organic stricture is usually readily made, inasmuch as organic dysphagia is unvarying and persistent, while aneurismal dysphagia varies from time to time—is complete at one period of the day, and wholly absent at another. It is also increased by any excitement of the circulation, and markedly relieved by position; thus a patient afflicted with aneurismal dysphagia may be able to swallow with tolerable freedom when he leans forward so as to free the œsophagus from pressure. I need scarcely caution against the great danger of using a probang in such cases; yet it seems not unlikely that in very obscure cases a properly constructed and carefully introduced probang might assist the diagnosis by revealing pulsation, while even a bruit might be audible through it.

PRESSURE ON THE BLOOD-VESSELS produces various well-known symptoms, amongst which I may mention alterations of the radial

pulses, so that one differs from the other in size or volume. We must, however, ascertain that this difference extends to the brachial, so that it may be free from the effects of irregular distribution of the radial. We must also never forget the possibility of this difference having been congenital. Perhaps the best mode of ascertaining whether this difference between the two radial pulses is congenital, or dependent upon aneurismal pressure, is to be found in the differences visible in the sphygmographic tracings of the pulse movements of each artery. Various head symptoms are also occasionally produced by interference with the cerebral circulation, headache, &c. Pressure on the brachial veins produces swelling of the corresponding arm, unaccompanied by any signs of inflammation. Its dependence on aneurism is made probable when it comes on suddenly during any violent exertion, and especially if accompanied by any bruit localized in the innominate, brachial, or carotid arteries (CASE XXVII.) In such cases the swelling usually disappears after a time, and this disappearance is accompanied by the appearance of a pulsating swelling in the upper part of the chest (CASE XXVII.) Great compression or even obliteration of the superior vena cava has been occasionally observed, and such cases are attended by a great development of the superficial veins. A moderate degree of this symptom is no infrequent occurrence, even where the compression is not so very great; a thick oedematous collar covered with enlarged veins surrounding the root of the neck in such cases. But in all these cases there are always plenty of other symptoms to lead us at once to the true diagnosis. Compression of the vena cava descendens or right auricle may give rise to congestion and dropsy, but these are usually late symptoms (CASE XXVIII.)

PRESSURE ON THE HEART by aneurism is a very frequent cause of its displacement. If the tumour affect the ascending portion of the aorta, the heart is displaced downwards and to the left; if it affect the arch, the displacement may be solely downwards; and when the descending portion is affected, the heart may either be displaced to the right, or if the tumour be seated just behind the heart, the latter is compressed against the anterior wall of the thorax, and gives a larger and more forcible impulse. Consecutive alterations of the heart in aneurism are slight, and of little importance; even when a double bruit at the right base reveals an alteration of the aortic valves which is most likely to be attended by great consecutive alteration, the changes as a rule are so slight

as to be unimportant, and have no ultimate bearing on the history of the case (CASE XXIII., &c.) The pressure of an intra-thoracic aneurism may even be so great as to depress the liver several inches, and communicate to it a well-marked pulsation, and of this I have seen one well-marked example.

When the pressure of an aneurism affects THE NERVES ISSUING FROM THE SPINAL CORD, in what has been termed the "cilio-spinal region," that is, according to Budge and Waller, from the sixth cervical to the sixth dorsal nerve, or according to Brown-Séquard as low as the ninth or tenth dorsal nerve, the anterior roots of which supply filaments to the cervical sympathetic which pass to the iris, then certain peculiar phenomena are observed, according to the amount of pressure excited. Thus, when the pressure exerted is considerable, permanent contraction of the pupil on the affected side is the result; but when it is only sufficient to excite and not to paralyse the nerves, dilatation ensues. When the former of these results is extreme, the effect is very striking, but there are a multitude of cases in which the difference between the two pupils is comparatively slight, and in which it is impossible to say which pupil is contracted, and which is dilated; also, in a small proportion of perfectly healthy individuals the pupils vary naturally in size, so that, interesting as this phenomenon is, it is of more importance in aiding us to fix the position of an aneurism we have discovered than in helping us to diagnose the existence of one which is only suspected.*

CIRCUMSCRIBED DULNESS is of course a usual symptom whenever the aneurism reaches the walls of the thorax. From the more or less globular shape of an aneurism, the tumour is always very considerably larger than the dull patch. Most frequently the dull spot is to be found on the right side of the sternum, on a level with the second or third ribs, and more rarely on the left side of the sternum, or over that bone itself, or on the back. In the latter case the aneurism will most commonly be found to arise from the posterior portion of the descending aorta, and it only very rarely passes to the right of the vertebral column. Of course over this dull patch we always have more or less pulsation, which is more

* Vide Dr. Gairdner, in "The Edinburgh Medical Journal," January and August 1855; Dr. Ogle, in "The Medico-Chirurgical Transactions," Vol. XLI.; and for the physiology of the subject an interesting paper by Dr. Argyll Robertson, in "The Edinburgh Medical Journal," February 1869.

or less fluid and forcible in character, according as the tumour contains more or less of fibrinous clots. As the disease progresses, the circumscribed dulness increases, the walls of the chest become involved in the tumour, which finally breaks through and appears on the surface as a pulsating swelling, in which condition its character is unmistakeable. Over the dull pulsating tumour various *Bruits* are audible, and these vary with each case. Perhaps what we ordinarily understand by a bruit is comparatively the rarest phenomenon audible over such a tumour in the chest, a systolic jog or shock being all that is appreciable in many such cases, though occasionally this jog is double. In such instances, however, it has seemed to me, from the firmness of the impulse, that it was probable the tumour was well coated with fibrine internally, but this is certainly not always the case. Most commonly we have the normal sounds of the heart propagated over the tumour, and in this case it has been long known, having been first pointed out in 1836 by Dr. Henderson, that the second sound, or that of the closure of the aortic valves, presents what he has called "a very striking resemblance to the shutting of a pump-valve in the immediate vicinity of the ear,"* and which has been variously designated by succeeding observers as a ringing, booming, or accentuated second sound. This, when heard over a circumscribed dull patch, is very distinctive of aneurism, and unless produced so near as to be readily propagated to the aortic area, or unless it be associated with dilatation of the aorta, it is not in these circumstances audible there. On the other hand, we have the same accentuation produced in that area whenever the aorta is dilated to any extent. Heard out of that area, therefore, and over a circumscribed dull patch, it is almost distinctive of aneurism; heard within that area, it is synonymous with dilatation of the aorta, and if under these circumstances it is heard propagated to the right or the left of the usual course of the aorta, the probabilities are in favour of dilatation with bulging (cirroid aneurism), rather than of a true saccular aneurism. When there is a double murmur at the base of the heart, the same murmurs, only intensified, are heard over the tumour. At times a systolic murmur of varying character, preceding the accentuated second sound, is heard over the aneurism, and still more rarely we have also a loud diastolic bruit. In the only case in which the latter occurred in my own experience, the opening of the aneurism was

* "Edinburgh Medical and Surgical Journal," Vol. XLV.

large and smooth, and it was difficult to account for the occurrence of a diastolic bruit at all (CASE XXIV.) A localized and circumscribed bruit anywhere in the course of the aorta, or of its larger branches, is always a suspicious sign, and ought to lead us to further inquiry; but inasmuch as it may arise from mere internal roughness, or from the pressure of a tumour in certain circumstances, it is of no value unless conjoined with circumscribed dullness, and even these are not conclusive unless associated with other confirmatory phenomena.

DELAY OF THE PULSE is a sign of atheroma, or of dilatation of the aorta, but not of saccular aneurism, which does not interfere with the normal propagation of the pulse.

THE DIAGNOSIS OF ABDOMINAL ANEURISM.

The diagnosis of abdominal aneurism is either very easy or the reverse. During a considerable portion of its course the abdominal aorta can be readily felt, and any alteration of its calibre distinguished by palpation. Should any tumour be perceptible, auscultation will reveal a systolic bruit solely; the second sound is never propagated into the abdominal aorta, and a diastolic bruit is equally unknown. When the tumour comes from the anterior surface of the abdominal aorta, no pain is ever complained of unless it arise very high up in its course, and almost or quite beyond the reach of palpation. Occasionally, however, flatulence and other symptoms of gastric disturbance are present (CASE XX.,) apparently depending upon interference with the innervation of the stomach. The immobility of a tumour during respiration is not, as was supposed by Dr. Henry Kennedy, a proof of its aneurismal character; it only shows that it is fixed by adhesions or otherwise, but does not by any means prove that it is connected with the aorta. When the aneurism, however, arises from the posterior surface of the aorta, and especially if it be beyond the reach of palpation, we can only arrive at the diagnosis of aneurism *per viam exclusionis*. By far the most distinctive symptom is the presence of severe neuralgic pain, at some times affecting the bowels, at others passing along the spine into the extremities, and, otherwise unaccountable; this pain, though tolerably persistent, is subject to variations like all other aneurismal symptoms, and now and then disappears for months at a time; this unaccountable disappearance may, in obscure cases, be regarded as to a certain extent confirmatory of the

diagnosis of aneurism. Dr. Beatty of Dublin has related a most instructive case of abdominal aneurism, in which the tumour lay between the crura of the diaphragm, and in which the character of the pain led ultimately to a correct diagnosis.* It is to be regretted that in this case no percussion nor auscultation were ever instituted down the spine, for there can be little doubt that the nature of this case might have been thus elucidated; and this should never be omitted in any similar instance, as the discovery of a localized dulness or arterial whiz would materially aid the diagnosis of such cases.

THE TREATMENT OF ANEURISM.

The course of an aneurism is usually chronic; it may last for many years, till death takes place, either gradually by asthenia or dropsy, or more suddenly by the occurrence of œdema, gangrene, or inflammation of the lungs, or from rupture of the sac either externally or internally into one of the serous sacs or a mucous canal. Death by pure asthenia is comparatively rare, a gradually increasing marasmus being usually hastened to its fatal termination by the occurrence of some acute complication or intercurrent disease, or by rupture of the sac. On the other hand, rupture of the sac is not always immediately fatal; rupture into a serous cavity usually is so, but there are many cases of so-called "weeping aneurisms" in which the sac communicates with some mucous surface, and occasionally pours forth small quantities of blood at irregular intervals for months or years. When the communication is with the alimentary tract, this leakage is not so obvious, except when so copious as to give rise to hæmatemesis, a state of matters but rarely followed by recovery, and yet of which at least one case has been recorded.† But when the blood is poured into the respiratory tract, attention is at once directed to this important symptom (CASE XXIX.) In Mr. Liston's case the period which elapsed between his first copious hæmoptysis and his fatal hæmorrhage was five months, without any intervening hæmorrhage; and Dr. Gairdner has related a remarkable case, in which from the first leakage to the last fatal effusion, no less a period than five years elapsed, during which there were repeated slight attacks of hæmorrhage.‡ But the most extra-

* "Dublin Hospital Reports," Vol. V.

† Gairdner "Clinical Medicine," Edinburgh, 1862, p. 495.

‡ Op. cit., p. 509.

ordinary cases of intermittent hæmorrhage are those recorded as having taken place from the external surface. Thus Neligan relates the case of a ship carpenter, with an aneurism of the aorta opening externally about the second rib on the right side in front, which for more than a year discharged blood at intervals; sometimes so copiously and in so full a stream as to be with difficulty arrested. Three weeks after his first hæmorrhage his aneurism underwent a marked abatement, and he left the hospital declaring himself quite well.* Nor is this case unique; several somewhat similar having been recorded. Perhaps the most extraordinary of these is one related to the late Mr. Syme, by Mr. Ramsay of Broughtyferry, of a man affected with aneurism of the arch and of the innominate, which ruptured opposite the cartilage of the third rib; a stream of blood is reported to have issued somewhat thicker than a quill; the patient nothing alarmed, held a bowl to receive the contents of what he supposed to be a bloody boil, and even squeezed it with his chin to empty it faster; when he had lost about a quart of blood he fainted, and the bleeding stopped. Four months subsequently he died of typhus, no new bleeding having occurred.† Thus even rupture of an aneurism, usually and rightly regarded with so much terror, does not always render the further treatment of the case utterly hopeless; and if this be the case with a ruptured aneurism, with how much more hope ought we not to attempt the cure of one still unruptured. Nature unaided has not infrequently succeeded in promoting the cure of such cases; and the medical art would surely be unworthy of the confidence reposed in it, were it incapable of following up and improving upon the hints afforded by nature even in this most serious disease. For nature can only cure under certain conditions and in certain circumstances, but art can change the latter, and modify or fulfil the former. Art, therefore, properly directed ought to cure more than nature; and as no cases are utterly hopeless, even when left to nature alone, so all ought to be more or less hopeful when under the guidance of art; and the more hopeful, the more intelligent the art that guides them is. The spontaneous or natural cure of aneurism is effected in three modes:—First, by sphacelus of the tumour, the arterial opening remaining closed; secondly, by obstruction of the artery to which the tumour is attached; and thirdly, by gradual

* Stokes "Diseases of the Heart and Aorta," Dublin, 1854, p. 582.

† "Monthly Medical Journal," January 1850, p. 89.

occlusion of the tumour with fibrine, the artery to which it is attached remaining pervious.* The first mode of cure has only been produced as it were accidentally, and cannot be imitated by art. The surgical treatment of external aneurism is based upon the second, which is obviously inapplicable to the treatment of large internal aneurisms. The medical treatment of internal aneurisms must therefore be confined to an endeavour to bring about the third method of cure. Of the spontaneous cure of aneurisms of the aorta, I myself have only seen two instances. The first was a small aneurism, rather larger than a large walnut, wholly filled with a firm, pale, fibrinous clot, and attached to the upper part of the ascending aorta, just where it passes into the transverse; it was removed from the body of a man who had died from the fatty form of Bright's disease (large white kidney), and who had not at any time presented symptoms of aneurism.† (*Vide Plate I. fig. 1.*) The second case was that of an aged woman, an inmate of one of our eleemosynary hospitals, under the care of Dr. Gillespie. In this case the tumour arose from the descending part of the aorta, just where it passes off from the transverse portion; it passed backwards into the left vertebral sulcus, and pressed upon the left lung, hæmorrhage from which, unconnected with the artery, but depending upon the disorganization produced by the tumour, had proved fatal. The aneurism was as large as an orange, was wholly filled with a laminated clot, and had presented none of the usual symptoms; it had been, in fact, wholly unsuspected. In this case the whole of the arch of the aorta was converted into bone, and was as firm as the handle of a walking-stick. (*Vide Plate I. fig. 2.*) Attempts have been made in various ways to produce this favourable termination, those depending for their success upon the employment of ordinary sedatives have so signally failed as to require no notice here. Even their use as palliatives has been unproductive of much benefit, and the most powerful anodynes have been almost useless in relieving the excruciating agony which is so commonly an accompaniment of this terrible disease.

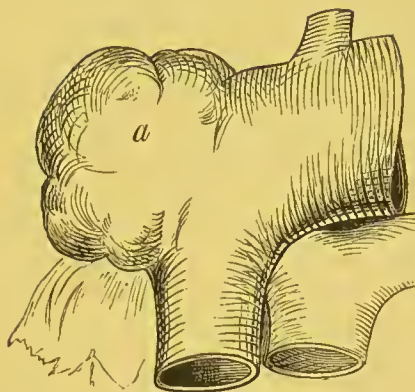
Of all the more modern attempts to relieve or cure this affection, there are six which seem worthy of mention, and the first I shall notice only because it is modern, and not because its employment

* *Vide* Hodgson "On Aneurism," London, 1815, p. 101. Many cases of the spontaneous cure of aneurisms will be found in this work.

† "Edinburgh Medical Journal," July 1870, p. 82.

PLATE I.

FIG. 1.

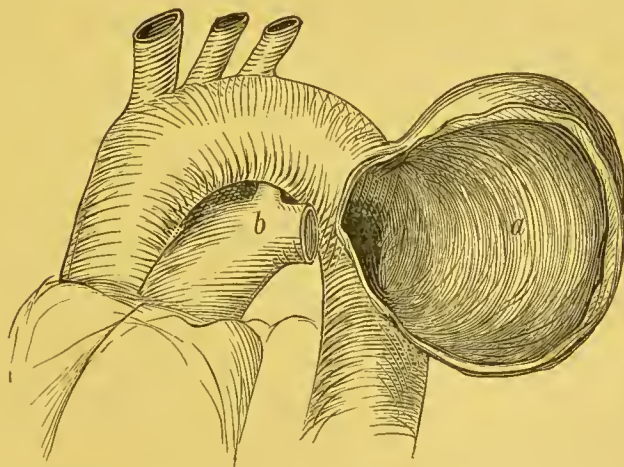


DR. BALFOUR'S CASE OF SPONTANEOUS CURE OF AORTIC ANEURISM.

a, Solidified tumour.

Prep. in Royal College of Surgeons Museum, Edinburgh.

FIG. 2.



DR. GILLESPIE'S CASE OF SPONTANEOUS CURE OF AORTIC ANEURISM.

a, Laminated clot which completely filled the tumour.

b, An unusually large impervious ductus arteriosus.

Prep. in Royal College of Surgeons Museum, Edinburgh.



has been either markedly beneficial, or apparently deserving of imitation, but rather because its use in these days affords the strougest possible testimony to the dangerous character of the disease, and the inefficacy of the remedies hitherto employed. I refer to the INTRODUCTION OF FINE IRON WIRE into an aneurism with the view of providing an extensive surface upon which the fibrine might coagulate. Twenty-six yards of such wire were introduced by Dr. Murchison and Mr. Charles H. Moore, through a fine pointed canula into a saccular aneurism of the ascending aorta. The treatment was unsuccessful, and it could hardly have been otherwise in the case referred to, as it was not employed until it was clear that the man had not many days to live. Why it was resorted to in such a case is not very obvious. The proposers of this treatment contend that their experiment showed that the principle upon which it was based was sound, and that further experiments are justifiable.* But surely nothing could justify so hazardous an experiment except the full conviction that no treatment less dangerous was available; and to this I of course demur, as I think I shall have occasion to show that we have a treatment free from danger, the success of which completely precludes our recourse to any similar experiments. Besides, this treatment is of course only applicable to saccular aneurisms, and for these when distinctly recognised, even though internal, we have a much more efficient curative agency in ELECTROLYSIS. Unfortunately, in regard to internal aneurisms, we can never be thoroughly certain that we have to do only with a truly saccular aneurism, and in any other the risk of embolism is so great that the employment of galvano-puncture in aneurism is chiefly restricted to those cases of arterial vascular tumours termed "cirroid aneurism," in the treatment of which its use is most successful; while in truly medical aneurisms, it is only available for the prevention of external rupture, for which—failing other means—it is admirably adapted, and therefore deserving of a short notice. Originally suggested by Pravaz for the cure of external aneurisms, in the treatment of which it has had a fair measure of success, as may be seen by a reference to the tabular statement given in Ciniselli's memoir,† to which I need not now further refer.

* "Medico-Chirurgical Transactions," Vol. XLVII., p. 129. London, 1864.

† "Sulla Elettro-Puntura nella Cura degli Aneurismi," Cremona, 1846; and "Edinburgh Medical Journal," April 1866, p. 926.

Its employment has been extended to thoracic and abdominal aneurisms by Ciniselli,* by Drs. James and John Duncan,† and by Dr. Decristoforis; ‡ these include eight cases of thoracic aneurism in only one of which was any amount of success attained; § the others were all unsuccessful; and one case of abdominal aneurism in which complete success seemed to be attained, but in which premature exertion was followed by the sudden death of the patient.¶ The results attained, therefore, in the treatment of internal aneurisms, have not been such as to induce us to hope much from galvano-puncture as a remedial agent in this class of disease, while the unavoidable risks of embolism are so great as to lead to its abandonment by almost all as a curative agent in such cases. On the other hand, the ease and rapidity with which clots can be so formed, is such as to most certainly lead to its employment as a *dernier resort* in all cases where an external rupture is imminent. For this purpose steel needles are employed, about five inches in length, and of the thickness of 0.07 inch, or No. 16 of wire-gauge; of this the non-insulated portion measures $1\frac{1}{8}$ inch in length, while the insulated portion, or that covered with vulcanite (or ebonite), measures $3\frac{1}{4}$ inches in length. If the steel be not gilded, the positive pole is rapidly corroded; but when the wire is of the thickness described, it is not acted on to such an extent as to have its efficiency seriously impaired; besides, when blood is the electrolyte, its corrosion results in the production of ferrous chloride, and, probably, of ferrous sulphate, salts which coagulate albumen and thereby increase the wished-for result.¶¶ Four cells of a Bunsen's battery are effectual, and produce no pain, or only a bearable amount of it; but as many as six cells sometimes produce so much pain as to render the patient incontrollable:*** so that if it should be thought desirable to use more than four cells, the patient ought to be placed under chloroform.

The battery should have a continuous current, and the needles

* Op. cit.

† "Edinburgh Medical Journal," April 1866, p. 920; and August 1867, p. 101.

‡ "Aneurisma dell' Aorta Ascendente, Trattato coll' Elettro-Puntura, caso Clinico," Milan, 1870, &c.; and "Edinburgh Medical Journal," December 1870, p. 537.

§ Loc. cit., p. 540.

¶ "Edinburgh Medical Journal," p. 922.

¶¶ "Edinburgh Medical Journal," August 1867, p. 119.

*** Loc. cit., p. 109.

should be introduced from the same side, near the base of the external tumour, parallel to each other, and one or two inches apart. The number of the needles employed may be multiplied, if the aneurism be large, and the action may be prolonged till pulsation ceases, or till gas can be clearly detected on percussion. A *séance* of about twenty minutes is usually enough for one application, and this may be repeated as necessary, according to the circumstances of the case. Such is a succinct account of the method of employing galvano-puncture in aneurism, a method of treatment not, however, applicable to the cure of internal aneurisms, on account of the risks connected with it, but one which may certainly be advantageously employed as a means of prolonging life in exceptional circumstances.

Comparatively recently the HYPODERMIC INJECTION OF ERGOTINE has been recommended by Professor Langenbeck of Berlin as a curative agent in the treatment of aneurism, on the strength of two cases which were thus successfully treated by him. The first was an aneurism of the subclavian and innominate, in a man aged forty-five, a pulsatile swelling the size of a closed fist existing in the supraclavicular fossa of the right side, accompanied by excruciating pain in the right arm, and consequent sleeplessness. From the 6th of January to the 17th of February, 1869, injections of ergotine, varying from half a grain to three grains, were made at regular intervals of about three days; and this treatment was followed by the great improvement of the patient and the considerable diminution of the tumour. The second case was a saccular aneurism of the radial artery, in a man aged forty-two. One single injection of ergotine caused complete subsidence of the tumour. Next day it returned somewhat, and slight swelling and infiltration could be felt in the neighbourhood of the puncture. By the end of eight days these had all disappeared, and not a trace of the tumour could be perceived.* Langenbeck is too well known as a careful observer to permit these cases to be ignored; at the same time, if the action of ergotine be, as he supposes, on the unstriated muscular fibre, it is difficult to perceive how it could possibly have any effect in this manner on the larger tumour described, as the muscular fibres surrounding it must have been few and sparse indeed. It is possible that this treatment may have some effect

* "Berliner Klinische Wochenschrift," March 1869; and "Edinburgh Medical Journal," November 1869, p. 461.

on the small aneurisms of the smaller arteries; but it seems impossible, for the reason stated, that it can have any effect on large aneurisms, especially of the larger arteries. I have employed it repeatedly, and in one case continuously for many months, without observing the very slightest result, and this though the preparation was unquestionably active, as evidenced by the very excellent results I obtained from its use in the hæmorrhages of small arteries, both in hæmoptysis and in epistaxis. It would, however, be unfair to omit allusion to this treatment in any treatise purporting to present the modern views of the treatment of aneurism. The preparation employed by Langenbeck was Bonjean's watery extract, diluted with three times as much of rectified spirit and of glycerine; that which I employed was prepared in this country, and was undoubtedly active, both as proved therapeutically and also physiologically, one grain of the preparation hypodermically injected sufficing to stop completely the circulation in a frog for fully five minutes.*

PRESSURE, as a mode of treating aneurism, is of course wholly inapplicable to thoracic aneurism, and also, as a rule, to abdominal aneurisms. One case of abdominal aneurism has, however, been recorded by Dr. William Murray of Newcastle-on-Tyne, in which pressure of the aorta immediately above the vessel was successful in curing the disease. The first attempt in this case, a man aged twenty-six, failed; on the second attempt the patient was kept for five hours under chloroform, and pressure was fully maintained by a properly constructed tourniquet. The result was that in three months the patient was at his work as an engine fitter, perfectly cured; the aorta beneath the tumour, the iliac, and the femoral arteries being quite pulseless.† Cases in which this mode of treatment is available must certainly be very rare, but it is proper to bear it in mind as a remedy capable, in fitting cases, of producing a much to be desired result in a very short time.

The treatment which has, however, for long been deemed the most suitable for internal aneurisms, is that denominated from its strongest advocate, VALSALVA'S TREATMENT, though as we learn from Morgagni, Albertini had an almost equal predilection for its use. This, when pushed as far as its originator desired, consisted

* Vide a paper by Dr. Hirschfeld, on "The Action of Ergot and Ergotine, in the *Medical Press and Circular*," February 1870, p. 139.

† "*Medico-Chirurgical Transactions*," Vol. XLVII., p. 187, London, 1864; and "*Medical Times and Gazette*," April 1865, p. 383, in which is a further report of the case, showing the cure to have been complete.

in weakening the patient by repeated bloodlettings, and by gradually diminishing his meat and drink till only half a pound of pudding was taken morning and evening, with only a certain quantity of water also weighed ; * so that at last the patient was so much reduced that he could not lift his hand from the bed in which, by Valsalva's orders, he lay from the commencement of the treatment. After this the quantity of nutriment was gradually increased, till the patient's strength was restored. That this treatment has been unquestionably useful in certain cases we have the testimony of many physicians, and it can hardly be thought necessary now-a-days to adduce seriatim evidence in favour of a practice originally suggested by Hippocrates,† and which after a varying fashion has kept its place in therapeutics ever since. ‡ In recent times this practice has been attempted to be revived in Edinburgh by Dr. Bennett, who expresses his determination to treat his next case more vigorously ; because a former patient, after forty days' treatment, during which he had been repeatedly purged freely, twice had a dozen leeches over the tumour, was once bled to ℥xij , and several times to syncope, besides being kept on extremely low diet, including ℥ij of steak and ℥ij of bread for dinner, yet retained sufficient bodily strength to walk two hundred and fifty yards to the nearest cab-stand on his way from the city.§ But in spite of its occasional success, modern physicians have almost unanimously agreed to discard it, and, as we have seen, have adopted the most hazardous procedures rather than have recourse to it. And this arises from two reasons, the first of which, and that really the least important, is the very great difficulty with which it can be carried out. In hospital patients it is all but impossible to do so efficiently, on account of the childish selfwill of the patients, and the facilities they have for transgressing ; it is only among the better classes that we can find men of sufficient firmness of mind fully to conform to the rigorous behests of this treatment. This, however, is the less to be regretted, as it was probably rather in spite of the treatment than by reason of it that cures were effected. The only patient I have seen who really complied with the treatment was not effectually benefitted, though his distressing symptoms were

* Morgagni "De Sedibus et Causis Morborum," Letter XVII., Oct. 30.

† "De Morbis," Lib. I., N. 10.

‡ Vide Hodgson, op. cit., p. 145, &c.

§ "Monthly Medical Journal," 1850, p. 169.

temporarily relieved. That, however, is of little consequence, as almost all modern physicians are fully agreed—and this is the second and most important reason why it has been given up—that this treatment fairly carried out is more apt to be injurious than remedial; because, from the repeated venesections, the heart's irritability is increased and its pulsations made more frequent; while, from the long-continued rigorous diet, the coagulability of the blood is diminished by the ultimate decrease of its fibrine. So much so that Dr. Copland remarks that he has seen aneurismal tumours, which had existed without any increase, so long as the patient avoided any vascular excitement and continued his ordinary diet, immediately become greatly aggravated, augmented in size, and hastened to a fatal result, when repeated depletions were practised, and vegetable or low diet adopted.* This is so consonant with physiology and experience that I shall not multiply quotations to prove it, but content myself with recording it as the main reason why this method of treatment has now ceased to be employed. On the other hand, we know, from the experience of the older physicians, that it is the force of the circulation which causes the enlargement of the sac and its ultimate rupture, and that hence the diminution of the force of the circulation is the principal indication in promoting the cure of aneurisms.† And this important truth has been fully confirmed by the experience of modern surgeons, who have found that to cure external aneurisms by compression, it is not necessary to completely arrest the flow of blood through them, but merely to moderate the current so that it shall be incapable of giving forcible distension to the walls of the sac.‡ Hence some physicians have been led to adopt a modification of Valsalva's process, in which the importance of the recumbent position is fully insisted on, while the diet is only so far restricted as to diminish the mass of the circulating fluid without impairing its physiological qualities. A very considerable amount of success has attended this treatment, six cases of marked improvement, some of them indeed of apparently perfect cure, having been recorded in the work just quoted § On the other hand, this treatment has not always been

* "Medical Dictionary," London, 1864, Vol. I., p. 77.

† Hodgson, *op. cit.*, p. 164.

‡ Tuffnell, "The Successful Treatment of Internal Aneurism," Dublin, 1864, p. 1.

§ Tuffnell, *op. cit.*

so successful, as is shown by CASE XV., (presently to be related,) among many others; it is also quite incapable of affording relief to the severe neuralgic pain which is so prominent a feature in many of these cases, and for the relief of which various other remedies were had recourse to with more or less success.

The treatment, however, which I am about to recommend, that by IODIDE OF POTASSIUM, relieves the pain and all the other symptoms of aneurism more rapidly and more effectually than any other, apart even from the powerful agency of the recumbent posture; and for the time it has been in use it has given greater and more permanent relief to a larger number of cases of aneurism than any other mode of treatment whatever. Indeed, the relief to the pain and other symptoms is so great and so speedily obtained, usually from the action of the drug alone, that it is often difficult to get the patient to submit to any restrictions. Besides, it is not always necessary. I am acquainted with a gentleman—CASE V.—who three years ago had a very large and forcibly pulsating aneurism arising from the ascending aorta and passing to the right side, who was permitted to go about in moderation during the whole period of his treatment, and in whom nevertheless the larger portion of the sac became consolidated, so that he has now only a comparatively feeble pulsation in its upper part. This gentleman continued the treatment steadily for an entire year, and has continued to take the iodide at intervals ever since. He is so well that for the last two autumns he has shot regularly on the moors, and during the late frost he got a severe fall without any damage whatever. He is so active that it is almost impossible to restrain his movements, yet he has received so much benefit that there can be little doubt the adjuvant of so powerful a remedy as the recumbent posture would in him have long since promoted a perfect cure. I need hardly say that aortic aneurism, even of considerable size, is not always incompatible with an active life. A few years ago there was in Dublin a prize-fighter by profession, who had a large aneurism projecting through his sternum; yet he suffered so little that he continued to maintain himself by his repulsive calling, only taking the precaution to put an iron cage over the tumour when he went to battle. And one of the cases subsequently to be related—CASE XXI.—for ten years maintained himself as an hotel porter, with a large aneurism projecting through the walls of his chest. So that mere continued immunity from suffering, and capacity for exertion, prove nothing. But when we find a drug relieving

suffering, mitigating every other symptom, and restoring capacity for exertion if lost; and that not occasionally, but in every case in which it has been fully tried; all who know anything of aneurism will agree with me that it must be a remedy deserving of the fullest confidence. Further, when we find, as we do find, that this remedy is capable of producing these favourable results apart from any adjuvance of diet or posture, our confidence in the truly remedial character of the action of the drug must surely be confirmed, though we may not be able accurately to explain what that action is, and even though it may seem to be in antagonism to what has hitherto been supposed to be its normal physiological actions.

As has been so often the case in medicine, the adoption of this mode of treatment has not been the result of any speculative ideas as to the nature of the particular disease, or the actions of the special remedy, but has been entirely based upon empirical observations; observations so opposed to all our preconceived ideas on both of these points, that it is as yet impossible to give any intelligible explanation of them. The late Dr. Graves of Dublin, *facile princeps* of all our clinical writers, was the first to direct attention to the beneficial action of large doses of iodide of potassium in painful rheumatic affections of the fasciæ and nerves; and it is now many years since Dr. Craig, late of Ratho, informed me that a patient of his, while being treated with that remedy in doses of seven grains, thrice a day, for concomitant rheumatism, had obtained complete relief from the neuralgic pains arising from a large aortic aneurism. It struck me at the time that the unexpected relief was perhaps not accidental, and that the treatment was worthy of further trial. No opportunity, however, occurred to me of putting it to the test. Meanwhile, about ten years ago, a Pole—CASE VI.—presented himself to M. Nelaton,* with a tumour in the lower part of the neck, which had been recognised by MM. Bouillaud, Andral, and Beau as an aneurism of the innominate implicating the aorta. He stated that while in Warsaw, his sufferings had been much relieved by the use of the iodide of potassium. M. Nelaton took

* These cases are referred to in Dr. Roberts' paper, presently to be quoted; they are detailed in the "Clinique Européenne" for July and August 1859. M. Bouillaud's cases are also quoted by the "Union Médicale" of March 8th, 1859, as having been contained in a clinical lecture published in the "Gazette des Hôpitaux" of the same year.

the hint, and continued the remedy, the result being, to his great surprise, a notable amelioration of all the symptoms, with almost complete disappearance of the tumour, so that the Pole returned home in a satisfactory state of health. M. Bouillaud was the next to follow out this plan of treatment in four cases which he has related. One was a female—CASE VII.—with an aneurism of the carotid, the size of a pigeon's egg; she had fifteen grains of the iodide of potassium for several days, and afterwards thirty grains a day for two months. At the end of this period, the tumour had diminished so much that it might be considered to have completely disappeared. The second case—CASE VIII.—was an aneurism of the brachio-cephalic trunk and aorta in a male, which, under the same treatment, underwent considerable displacement and well-marked diminution in size. He was still under treatment when these cases were published. The third case—CASE IX.—was that of a large aneurism at the point of origin of the carotid and subclavian in a male, which was considerably diminished in size in a few weeks; and the fourth—CASE X.—was a carotid aneurism in a male, which had also almost completely disappeared in a few weeks, under the same treatment.

It is somewhat singular that, while this problem was thus being experimentally worked out in our Western hemisphere, an independent observer in the Eastern one, having had his attention casually directed to this peculiar action of iodide of potassium in aneurism, was also empirically investigating the subject with no less remarkable results. On commencing hospital duty in August 1860, Dr. Chuckerbutty* of Calcutta found in the wards an Irishman,—CASE XI.—aged fifty, afflicted with a harassing cough, accompanied by profuse expectoration, which remained unrelieved by any treatment until a solution of iodide of potassium, in decoction of cinchona, was employed. Coincident with the relief to the cough thus obtained, Dr. Chuckerbutty was astonished to find that an aneurism of the innominate, from which this man also suffered, became gradually solidified. This aneurism projected above the sternal notch, and was at first the size of a walnut, with thin walls, and readily emptied; it grew steadily upwards into the neck, passing beyond the median line, till it attained the size of an orange, subsequently becoming hard and consolidated under the use of the remedy referred to. Some months afterwards, the man died of an

* "British Medical Journal," 19th and 26th July, 1862.

attack of bronchitis, and the aneurismal sac was found to be as large as a pear, filled with dense coagula, which left merely a narrow channel on its outer aspect, through which the right carotid and subclavian communicated with the aorta. Suspecting that there might be some casual connection between the remedy employed and the curative result so unexpectedly attained, Dr. Chuckerbutty proceeded to treat several other cases of aneurism in the same manner, and of these he has related three. In the first of them,—**CASE XII.**—a man, aged forty-seven, with an immense aneurism of the aorta, great temporary relief was obtained from the use of four grains of the iodide of potassium thrice a day. This treatment was continued from December 7th to January 12th, when death occurred from rupture. Three hours after death, the sac was found filled with dense solid coagula. In the second case,—**CASE XIII.**—also a large aortic aneurism in a male, though under treatment for less than three weeks, there was so great a temporary amendment, that the man thought himself cured, and insisted on leaving the hospital to spend Christmas with his friends. He did not return till after the lapse of more than three months, and then his symptoms were all intensely aggravated, and he died in three days. The third case,—**CASE XIV.**—was that of a man with an aortic aneurism, projecting as a dome-shaped tumour, two inches in diameter, through the sternum. Various remedies had been previously ineffectually employed in this case, but, under the use of iodide of potassium internally, along with the application of tincture of iodine externally over the tumour, the patient steadily improved, the thoracic pain disappeared, the swelling diminished, the hæmoptysis ceased, and the patient ate and slept like any other man. He was still under treatment when the paper was sent home for publication. Dr. Chuckerbutty points out that the consolidation of the contents of the aneurismal sac is the important fact in the histories of these cases, and contends that this probably depends upon some hitherto unsuspected action of the iodide of potassium on the blood; and this opinion seems also to be shared by Dr. W. Roberts of Manchester, to whose interesting paper I shall now refer.

About the beginning of 1863, Dr. W. Roberts was consulted by Mr. T. Windsor in regard to a case of aneurism, and his attention for the first time directed to the important remedial action of iodide of potassium in that disease. The case—**CASE XV.**—was that of a lady, aged twenty-nine, who had an aneurism of the aorta, implicating the origin of the innominate;

there was excessive pulsation at the lower part of the neck on the right side, repeated slight attacks of hæmoptysis, occasional loss of voice, dysphagia, constant troublesome cough, with scanty expectoration, and recurring paroxysms of pain and dyspnœa so severe as to compel her to get up and walk about. Under a regulated diet and strict confinement to the recumbent posture, her condition steadily became aggravated; she became so weak and emaciated as to be unable to leave her room, and the right clavicle began to project half an inch beyond its natural level, while the pulsation was much increased. In April 1863 she was put upon iodide of potassium, with the view of relieving the severity of the pain, and this object having been attained, the remedy was discontinued, after having been employed for only one week. At last, in July 1863, when she was so much worse that death seemed not far off, Mr. Windsor put her upon five grains of the iodide of potassium thrice a day, subsequently increased to ten grains, and again reduced to five on account of the occurrence of violent salivation. This latter dose agreed, and the patient continued taking it up to the time of the publication of the case,* the result of the treatment being a rapid subsidence of all the general symptoms, complete cessation of the cough, pain, dysphagia, and hæmoptysis, while the patient gained flesh and strength, and, in a few months, was able to walk six miles, the clavicle having subsided to its normal position. Dr. W. Roberts† subsequently treated in the Manchester Royal Infirmary a male patient,—CASE XVI.—aged thirty-nine, in whom the first bone of the sternum and its vicinity were the seat of heaving pulsations, while in the second left intercostal space there existed a conical, soft, pulsating elevation, projecting about a quarter of an inch, and with a base the size of a shilling. Over the bulging parts, there was an area of dulness, measuring transversely four inches and a half, and vertically three inches and a half. There was pain in the left side of the head and shoulder, dyspnœa, dysphagia, and some cough. The patient was put upon a restricted allowance of fluids, and had five grains of iodide of potassium given him thrice a day. In three days the dose was raised to seven and a half grains thrice a day; and in six days the patient expressed himself as much better, his pain gone, and the cough and difficulty of breathing less troublesome. The dose of the iodide was then raised to ten

* Vide "British Medical Journal" for January 24th, 1863.

† Loc. cit.

grains thrice a day, and after seventeen days' treatment, the pain, dysphagia, and dyspnoea were quite gone; the soft pulsating tumour had entirely subsided; he was allowed to get up, and his restrictions were relaxed. The dose was now increased to fifteen grains, and after twenty-five days' treatment, to twenty grains, thrice a day; but after this dose had been continued for about fifty days, it had again to be reduced to five grains, on account of the supervention of diarrhoea. The bulging was decidedly less, the area of dullness reduced to three inches and a half transversely, by two inches and a half vertically; the elevated tumour had quite disappeared, and the general pulsation was almost gone, but the enlarged superficial veins, and the stridulous voice, still remained to show that the cure was not complete. In this case decided emaciation was the concomitant, if not the result, of the treatment. Dr. W. Roberts* also relates a case—CASE XVII.—which occurred under the care of his colleague, Dr. Wilkinson, of a large thoracic aneurism in a male, projecting in the neck as a tumour the size of a child's head, extending from the left clavicle to the angle of the jaw, and apparently about to burst. Fifteen grains of the iodide of potassium were administered thrice a day, the pain was lessened, and the growth seemed stayed, but the patient died in seventeen days from gangrene of the lung, the effect of pressure upon the left pneumogastric nerve. The sac was found lined with coagula, and a large firm blanched clot attached by a broad pedicle to its upper part floated free within it.

I myself have employed this method of treatment during the last three years in a very considerable number of cases, with unvarying success so far as the relief to symptoms is concerned, and with such favourable results as to retarding the further progress of the case, and even in some cases promoting an apparent cure, as certainly stamp this treatment as one of the most efficient hitherto propounded for the relief of this intractable complaint; while it has certainly the not despicable property of being uninjurious to the patient in any respect. I shall now give a selection from the cases treated by myself, bringing them down to the present date, so far as known.

CASE XVIII.—Peter Rice, a mason, aged thirty-nine, admitted into Ward III. on the 29th of April, 1867.† Patient has

*Loc. cit.

†This case was primarily under the care of Dr. Warburton Begbie, acting for Professor Laycock, and was transferred to my care when the clinical wards were closed, at the end of the summer-session of 1867. The case is partly condensed from the Report in the clinical records of Ward III.

never had rheumatic fever, but for the last five years has been subject to rheumatic pains in his hip, leg, and back, which are generally severe, and are most apt to recur in the changeable weather of spring. He has been in the habit of drinking pretty freely. About twelve months before admission, he fancied he was overwrought, and when he got home, he found he could not take a deep inspiration freely; he also felt a sharp pain at a point about two inches to the right of and a little above the left nipple. This pain has continued ever since, and has latterly increased considerably. It is stationary at the part described, but when more severe than usual, it spreads upward to the armpit and shoulder, and down the left arm to the wrist, occasionally extending downward to the scrobiculus cordis, and sometimes striking sharply through to a corresponding point in the back. It is specially apt to be severe at night, preventing him from sleeping, and is very annoying when it affects his back, as he cannot lie in any other position than supine. He has occasional fits of dyspnœa, and it is always painful for him to take a full inspiration. He has also some difficulty of swallowing. He is much troubled with palpitation and a distressing feeling of pulsation, and these sensations annoy him most when the pain is severe. At such times, he obtains some relief by relaxing the respiratory muscles, by stooping forward and leaning against a wall or other support, with his hands and arms extended. About a week ago, his symptoms had increased so much that he was obliged to cease working altogether. His appetite is good; his bowels generally confined. On percussion, the heart seems of normal size; its pulsations are distinct, and in their ordinary situation; the first sound is normal, the second accentuated. The right radial pulse is fuller than the left. About three years ago, the patient had *muscæ volitantes*, lasting off and on for about two years, appearing only for a few seconds each time; and still at times, he cannot see things at a distance so well as he thinks he ought, the letters seeming to swim before him when reading. His left pupil is slightly dilated. Some time ago, he also had tinnitus aurium. His left cheek is often flushed, and at times he feels it warmer than the other. His lung sounds are normal, but he has an imperfect, hard, clinking cough, without expectoration. He also frequently perspires without any apparent cause. There is a slight bulging of the walls of the chest, between the second and third ribs, at the left edge of the sternum, extending into the manubrium sterni, and gradually de-

clining all round within an area covered by that of the mouth of a tumbler. Over this space there is a dulness on percussion, and a distinct sense of liquid pulsation. Within this region, the heart-sounds are also extremely distinct, but there is no bruit.

Twenty grains of iodide of potassium were ordered to be given three times a day, and a belladonna and opium plaster was applied over the tumour. About a month after, on the 23rd of May, as the patient fancied he was not improving, the iodide was omitted, and a precisely similar dose of the bromide of potassium was substituted for it. At first, the patient fancied the change of remedy had done him good, for he had less pain, and got more sleep; but this improvement was apparently of short duration, even though the dose of the bromide was subsequently increased to thirty grains thrice a day, for on the 7th of June the iodide was again resorted to in doses of twenty grains thrice a day, with the addition of one-twelfth of a grain of iodine in each dose. On the 17th of June, it is stated that "there is more pain over the aneurism, and he feels his left hand benumbed. The swelling seems to have increased in size since the 15th instant." On the 7th of July, however, it is entered that he "states that the pain in his breast and down his arm are not nearly so bad as they used to be, so long as he is quiet in bed; but when he rises and walks about, they become even worse than before." The patient continued to wear the belladonna plaster, but on the 7th of July the iodide was omitted, probably on account of coryza, which, though not recorded, the patient told us he suffered from about this time; and on the 8th the following pills were prescribed:—

R Extr. aloës aquosi, gr. j.
 „ colchici acetic, gr. j.
 Mass. pil. hydrarg. subchlor., gr. ij. Misse.
 Fiat. Pil. Mitte tales xij. Sgr., One night and morning.

There is no further record in the books of Ward III. as to the iodide being again resumed, and I am not aware whether it was or not; I believe, however, that it was. The last entry is on July 18th, "Thinks himself easier to-day."

On the 1st of August, the patient was transferred to Ward VII., and placed under my care. He was at once placed upon thirty-grain doses of the iodide of potassium three times a day, and these doses he has continued to take without intermission up to the present time (May 1868), with continually increasing benefit, and without the production at any time of the slightest unpleasant symptom.

For several months, he also continued to wear a simple belladonna plaster over the tumour, but at last it blistered him, and produced so much eczematous eruption each time it was attempted to re-apply it, that it had to be discontinued. On coming under my charge, he was strictly confined to bed, and for long he lay entirely on his back, that being the only position in which he found always comparative, and latterly perfect, ease. He was only allowed to get up and move about for the first time about three weeks before his dismissal on the 2nd of April. He was placed upon fish diet at first, meat being subsequently given when he tired of the fish, but he was at all times carefully warned of the necessity for strict moderation both in eating and drinking; water, small quantities of tea, and milk for supper, being the fluids supplied. With all this care, and notwithstanding the large doses of the iodide administered, his progress at first was extremely slow, but it was steady. In a clinical lecture given on his case on the 19th of November last, I find it stated "there is no longer any tumour visible, and it is only on careful examination that you will discover any pulsation; he is so far recovered, that he is a little inclined to be rash, and to move about quickly in bed, or even to turn upon his side; but upon this the pulsation instantly returns—a sufficient warning to him that he is not yet cured." Indeed, it was not till the beginning of March in this year, that he was able to move about freely, without discomfort or any return of the pain or pulsation. On the 1st of April, I had the pleasure of exhibiting this patient before the Edinburgh Medico-Chirurgical Society, just previous to his discharge from hospital, when its members had the opportunity of observing the complete subsidence of the tumour described, pulsation being only obscurely felt in the situation where it formerly existed; they also heard the man's statement that his pain, dyspnœa, and dysphagia were gone; and they were able, from his healthy and energetic appearance, to form some idea of the importance and value of this mode of treatment. I may add, that I have repeatedly seen this patient since his discharge, and that he still continues to improve; while, from the active manner in which he marches through the streets, no one would suppose that but a year ago he was what might well be thought a hopeless invalid, afflicted with one of the most terrible and incurable of maladies.

A year afterwards I reported to the Edinburgh Medico-Chirurgical Society as follows. Peter Rice, labouring under aneurism of the aorta, has been repeatedly under observation

during the past twelve months. When first dismissed he acted as night-watchman for a month or two; he was then appointed to an institution for the care of orphan children, and he walked about with them, and took them to and from school; latterly, I believe, he has set up a small shop, as the easiest means of making his living. He has continued to take the iodide of potassium, latterly more irregularly; he continues quite as well, *quoad* the aneurism, as when dismissed; there is the same dull thud as formerly in the second intercostal space, but no pain nor any uneasiness has ever complained of.*

Rice continued to present himself occasionally, till at last after a longer interval than usual I found him in his working clothes busy laying pavement on the street. Since that time he has continued to employ himself at his old trade of a mason, and quite recently (March 1871) I ascertained that he was continuing perfectly well. Not having seen him recently I am unable to state accurately his present condition. The laborious occupation he now pursues after such a lapse of time is however a sufficient proof that his relief was not merely temporary and illusive, but a real and decided amendment. To what extent it is entitled to the name of a cure subsequent events can alone reveal, but surely it is something akin to a cure to restore to usefulness one who not many months ago was crippled by the agonies of so terrible a complaint as aortic aneurism.

My next case, though more obscure in its diagnosis, was even more immediately satisfactory in its results.

CASE XIX.—John Kerr, a seaman, aged twenty-six, admitted into Ward VII. on the 22nd of October 1867. He states that he has been ill for eighteen months, dating his illness from the privations to which he had been exposed when on an Arctic voyage, and the strenuous exertions he was, while in an enfeebled condition, obliged to make in hauling the boats over the ice and frozen snow. While in America he has been somewhat roughly handled for various diseases with which he was supposed to be afflicted. At last the diagnosis culminated in that of aneurism of the abdominal aorta, and to get relief from this, he crossed the Atlantic, and presented himself at the surgical wards of the Royal Infirmary here, and from them he was transferred to my care. He complained of intense pain in the scrobiculus cordis extending through to the back, and passing round

* "Edinburgh Medical Journal," July 1869, p. 47.

both sides. On examination, a tumour could be obscurely felt a little below the sternum, and just under the edge of the right ribs; this was more distinctly perceived, falling, as it were, into the hand on turning the patient over on his left side; and in the situation referred to, a loud bruit was to be heard with the stethoscope. Notwithstanding the obscurity of the diagnosis in this case, it was considered right to place this man under the influence of iodide of potassium, as a treatment likely to be useful, whether the tumour was solid, or was really an aneurism. Accordingly, he got thirty-grain doses of the iodide of potassium twice a day; he was placed on fish diet, a restricted amount of fluids, and confined to bed. The result was most encouraging; he got almost immediate relief from the agonizing pain, while the uneasy pulsation felt by the man himself was also at once considerably lessened, and the force and fulness of the radial pulsations, as observed by us, seemed to be also greatly diminished. He continued steadily to improve: in a few months the tumour and bruit had completely disappeared, and, on the 22nd of January 1868, he was dismissed at his own request. He considered himself so well, that he engaged for a short voyage for the purpose of testing his re-acquired health before finally proceeding to sea. This case is one, the obscurity of which is patent to all, and I am not disposed to press the diagnosis of aneurism; nevertheless, the symptoms pointed strongly in that direction, while the success of the treatment, and the manner in which the relief was obtained, seemed also to confirm it.

A year afterwards I reported the subsequent history of this case as follows. John Kerr, supposed aneurism of the abdominal aorta, left for a trial voyage, but never returned, and was given up as lost, and probably dead, when, in January of this year (1869), the nurse got a letter from him dated Australia, and saying that he was now so well, nearly a year after his discharge, that he was about to give up the sea and go to the gold-diggings.* Since then I have heard nothing of this patient.

The diagnosis in the next case was more unequivocal, and his history can be brought down unbrokenly to the present day.

CASE XX.—James Wilson, aged forty-four, a mason from Newcastle, admitted into Ward VII. on the 31st of August, 1867. About nine months before admission, this patient began to have occasional attacks of lightness in the head, accompanied with a

* "Edinburgh Medical Journal," July 1869, p. 48.

flashing of light before his eyes. These attacks came on usually while he was at work, and obliged him to sit down for a little to recover himself. At first, they occurred once or twice a day, but they soon became more frequent, and he always felt much weaker after them. During these attacks, he suffered from profuse perspiration. About the same time, the patient began to suffer from "beatings" in his abdomen, in the left side of his chest, and on the right side of his neck. At the last-mentioned place, a swelling appeared, which gave him great uneasiness, and produced a choking sensation. He consulted various medical men without relief, and at last came to Edinburgh, as already stated. On admission, it was found that he had no radial pulse in the left arm, but there was nothing to account for this, the "beatings" on the left side being apparently merely cardiac palpitation; on the other hand, those in the abdomen, and on the right side of the neck, had each an anormal and evident cause. About the lower part of the epigastric region, towards the left side, and lying close above the aorta, the course of which could be distinctly traced, a small pulsating tumour, the size of a small orange, could be distinctly felt, pulsating itself, and not merely moved by the artery beneath it; over this tumour a loud bruit could be heard. On the right side of the neck, there was also an evident pulsating tumour, extending up into the neck from the sterno-clavicular articulation, and towards the mesian line. This tumour was somewhat larger and longer than that in the abdomen, resembling in shape and appearance a large kidney potato. Upon any excitement, and especially when the man was up and walking about, its size increased considerably. No distinct bruit was heard over it, nevertheless it was evidently an aneurism implicating the innominate, subclavian, and carotid arteries. He was at once placed upon thirty-grain doses of the iodide of potassium twice a day, which he has continued to take steadily, with occasional intermissions, during his treatment, and a diet and regimen similar to that already described, were prescribed for him; but as his symptoms were not so severe, strict recumbency was not insisted upon, and he was allowed to go to chapel every night. The intermissions in the use of the iodide were necessitated from the circumstance that it was not so well borne by him as by the other two patients; every now and then, pain in the stomach, or severe headache, giving warning that it was time to stop it. These symptoms, however, always abated after leaving off the medicine for a day or two. His appetite was

always good, but his bowels required to be regulated by medicine. No immediate effects were observed from the remedy, but after the lapse of some months, the abdominal aneurism was found to be quite firm and solid to the feel, while the bruit had disappeared, and could only be reproduced by pressing somewhat strongly with the stethoscope; the tumour is now apparently gradually disappearing. After a time, and only within the last two months, the aneurism in the neck ceased to swell out when he walked about; it also gradually became firmer, and though still quite evident, he no longer suffers any inconvenience from it. The coats of the arteries in this position seem to have undergone fusiform dilatation, and it is doubtful whether further treatment will be of any avail. His health has, however, much improved; he has no longer any disturbing pulsations; and though he occasionally suffers from lightness in the head, and dazzling flashes of light, his condition is unquestionably better than it was, and, considering his inveterate aneurismal diathesis, he has probably reaped as much benefit from the treatment as is possible under the circumstances.

A year subsequently I reported of him as follows. James Wilson, labouring under an aneurism of the innominate, implicating the carotid and subclavian arteries, also an aneurism of the abdominal aorta, and a general aneurismal condition of the vessels. This man worked for many months comfortably, and without inconvenience, at his trade of mason, avoiding, as desired, any heavy lifts; he has now, however, got an easier berth in connection with the Caledonian Railway. His abdominal aneurism may still be felt as a hard, firm knot, now much diminished in size. His innominate aneurism never troubles him, giving rise to no symptoms. But it is not consolidated; neither, however, is it any longer a true aneurism. At least it presents no symptoms of such a tumour, being to all intents and purposes apparently restored to the condition of an elastic artery, enlarged, but still an artery; fusiformly dilated no doubt, but no longer bulging as it did as a pulsating globular tumour stretching across the trachea, and no longer giving him any discomfort or uneasiness.*

This poor man presented himself repeatedly for inspection and advice, and occasionally came into hospital for a week for relief of catarrhal symptoms, his aneurismal symptoms remaining unchanged till the 27th of June 1870, when

* "Edinburgh Medical Journal," July 1869, p. 48.

he re-entered hospital on account of a recurrence of the symptoms of abdominal aneurism. The original aneurism was distinctly to be felt as a small hard nodule resting upon the aorta just beneath a large, soft, pulsating swelling, passing up beneath the ribs on the left side. Over this pulsating swelling a single systolic bruit was audible, the subjective symptoms were confined to flatulence and occasional pain of a dyspeptic character in the stomach. He was treated after the old fashion, with the iodide of potassium, and with a similar result; for by the beginning of December 1870 he was so well that I was thinking of discharging him, when he began to present symptoms of typhus; a disease which, so far as ascertained, is believed to have been communicated to him by unauthorized and irregular contact with convalescent fever patients in the infirmary chapel. For this disease he was removed to the fever wards, where he passed through the regular course of typhus, and after being disinfected, he was received back into a side-room seven weeks subsequent to his being transferred. At the present date (January 24th, 1871), his abdominal tumour measures six inches, from the lower edge of the hard nodule of the former tumour, to the point where it disappears beneath the ribs. The tumour lies along the course of the aorta; it is three inches in superficial breadth, and can be readily grasped through the thin parietes; it is felt to be firm and devoid of lateral pulsation; and unless unduly pressed upon by the stethoscope, it conveys to the ear no bruit whatever, merely a dull thud. At its upper extremity, however, an occasional and trifling systolic bruit is still perceptible, just where it dips beneath the ribs, and this part seems to have somewhat enlarged during his illness. A second time, therefore, this man has been rescued from the jaws of death by this treatment. That it has failed to wholly arrest the process need not, under the circumstances, be wondered at, but we are rather disposed to marvel that so frail a body has survived a disease to which so many powerful men have succumbed. As yet, he can scarcely stand, but I have no doubt that the successful result of the treatment has only been postponed by this untoward event.*

CASE XXI.—Peter Reid, hotel porter, aged forty-six, admitted into Ward VII. June 18, 1868. This man was drunk when admitted,

* This patient is still (March 18, 1871) under treatment; the tumour, however, is now quite solid, and no bruit is audible over it. He was seen yesterday by Dr. Fitch, of Portland, Maine, who satisfied himself as to the reality of his improvement.

having avowedly taken spirits to nerve himself for his apparently rapid approaching dissolution. He had intense dyspnoea, amounting to complete orthopnoea, violent, harassing, but dry cough, and felt and looked as if on the point of suffocation, while a large, soft, projecting and pulsating tumour seemed to threaten him with death in another form. He was ordered at once fifteen minims of chlorodyne, to be repeated every half-hour till the cough was quieted, and also

R Pot. iodidi, ℥ss.

Infusi chirate, ℥vj. Solve.

Sig., One tablespoonful (℥ss.) three times a day.

He was also, of course, desired to keep his bed, in which he was supported in a semi-erect posture, and to restrict his food and drink. Within twenty-four hours this man expressed himself as somewhat relieved, and in a few more he began to breathe more freely. He is an old soldier, and about twenty-four or twenty-five years ago was cupped in a military hospital for palpitations, which continued more or less after his discharge, till about ten years past, in the end of February 1858, he came into this hospital on account of excruciating pain in the right side and down the right arm, which he had felt for some months previously. There was also at that time a slight swelling, accompanied by pulsation, to the right of the sternum. This pain was also most excruciating in winter, when he caught cold or had any unusual exertion. After eighteen months the tumour protruded externally, and the pain then ceased to be so agonizing. During the last eight or nine months the tumour has grown more rapidly than it has done for years, and this he attributes to the extreme violence of the cough. He has been under various physicians both here and in London, and has been, so far as he knows, mainly treated with digitalis and hyoscyamus internally, and the application of ice externally. To the right of the sternum was a large pulsating tumour, extending from the third to the seventh ribs, and projecting fully an inch and a half beyond the level of the ribs. Part of this tumour was solid, but part, rather beneath the middle, was soft, painful to touch, projecting conically, and pulsating fluidly. Dulness extended for fully five inches all round the centre of the tumour, passing into the liver dulness beneath. The pulse in the right arm was smaller than that in the left. The heart's apex beat between the sixth and seventh ribs and one inch to the right of the nipple, but there was no apparent hypertrophy, and the cardiac dulness was about normal. There was displacement but not enlargement, neither was there any anormal

bruit over either the heart or tumour. The right pupil was somewhat dilated. There was considerable pain in the side and down the right arm, but nothing to what it had been. After the patient had somewhat recovered from his frightful condition on entrance, a belladonna plaster was applied over the tumour, and the chlorodyne was gradually stopped as the cough ceased, which it had almost entirely done by the 12th of August, at which date the patient looked, felt, and expressed himself as much relieved; the pulsation in the tumour was much less forcible than formerly, and the tumour itself was flatter and more solid. On the 31st of August an ice-bag was substituted for the belladonna plaster, but was only continued for four days, because, although it felt comfortable to the patient, and relieved the distressing pulsations, it increased the cough very much; the belladonna plaster was, therefore, reapplied. At this date he expressed himself as feeling very comfortable, and able both to breathe and swallow easily, neither of which he could do formerly, while the tumour was gradually decreasing. On the 21st of September, however, the cough had again become very troublesome, accompanied by a distressing tickling sensation in the larynx, and an increase in the aneurismal pulsations, which were just as bad as they had formerly been. Chlorodyne made him sick, so he was ordered—

R Morphiae hydrochloratis, gr. j.
 Acidi hydrochlorici dil., ℥v.
 Acidi hydrocyanici dil. 3 ss.
 Syrupi scillæ }
 Aquæ fontanæ } áá 3j. M.

Sig., One teaspoonful every two or three hours. Fifteen minim doses of chlorodyne to be given *pro ré nata*, if he can be persuaded to take them; the iodide of potassium to be continued thrice a day, and the exterior of the larynx to be painted with iodine liniment.

In a couple of days the cough was much relieved, and he continued improving up to the 8th of November; on the evening of which day he was suddenly seized with inability to move his left arm, and complete loss of pulse in it; he expressed himself as feeling great pain in the left side of the heart, but there was nothing anormal in the heart's action. By next day the pulse had returned, but the arm continued feeble for a few days. On the 10th of November a very violent serous diarrhoea set in, for which he was ordered—

R Plumbi acetat., gr. iij.
 Pulv. opii, gr. j.
 Ft. pil. Mitte tales xij.

Sig., One to be taken every hour till the diarrhoea is checked, or sleep ensue; to be gradually dropped as improvement takes place.

Believing this diarrhoea to be a mere accident and not an evidence of iodism, the iodide of potassium was not stopped. The diarrhoea was much relieved by the next day, and ceased entirely in a day or two. At this date, the end of November, after five months' treatment, the patient's improvement was quite remarkable, the pulsation in the tumour very much lessened, the tumour itself perfectly solid at every part, and visibly decreased in size. I still, however, kept the patient in bed, and continued the treatment, in the expectation that I should ultimately have the pleasure of seeing the complete disappearance of even this large projecting tumour—an expectation which my experience leads me to consider well founded. Unfortunately, about the end of December, my patient caught cold; so I then thought; I am now inclined to attribute to another cause the violent cough which then set in. Upon the 30th of December, at the visit, he was seized with violent spasmodic pain in the left short ribs, for which a mustard cataplasm was applied, with full doses of chlorodyne, to be repeated as required. This pain was speedily removed, but now and for some time afterwards he complained of feeling choky, and was harassed by a dry clanging cough, which resounded from one end of the ward to the other. For this, iodine liniment was repeatedly painted over his chest; opium and morphia in every conceivable form, and in almost poisonous doses, hydrocyanic acid, and inhalations of chloroform, and of a solution of conium in chloroform were unavailingly persevered in for about a month. Toward the end of January, fifteen-minim doses of chlorodyne being still allowed *pro ré nata*, other narcotics were stopped, and five minims of tincture of aconite (B. Ph.) were added to each dose of his iodide of potassium mixture, of which he had four doses in the day, each containing half a drachm of the iodide. The aconite was ordered to be gradually increased by drop doses daily. How far it was pushed I am not quite aware, because it was added by the house-physician himself. I am well aware, however, that the relief to the cough was very slight, and I also know that towards the end of February I happened to look into the wine-roll, and found, to my horror, that Reid was getting four ounces of brandy daily. This I immediately knocked off, with far more relief to his cough than I had been able to give him by all the narcotics I had been so lavishly pouring into his system. I found that he had over-persuaded the house-physician, stating that he was weak, accustomed to stimulants, and would never get better without them—all the ordinary arguments

for self-indulgence. I found also that he had commenced with a pint of porter on the 3rd of December; that this had done him no harm; but an advance to four ounces of whiskey on the 24th of December had been very speedily followed by an exacerbation of his cough, not lessened by a retrogression to a whole bottle of pale ale on the 12th January, probably increased by a change to four ounces of brandy on the 25th of January, and only remedied by knocking off all stimulants on the 25th of February. I at once saw that no more good was to be done: the element of mutual confidence was lost. I therefore permitted Reid to rise every day and walk about the ward; the iodide mixture was continued, but the aconite was stopped; and I must say, that not one of my patients ever rose from their beds such a scarecrow as Reid did. This I attribute partly to the stimulants he had unfortunately obtained, and partly to the narcotics by which the evil results of his self-indulgence were so unavailingly sought to be neutralized. He was kept in hospital for three weeks longer, during which time he continued to improve, and was then dismissed on the 20th of March to go to his home in London. Thus this poor dying creature was, after nine months' treatment, dismissed in a comparatively active condition, and both looking and feeling well. A cast taken from the projecting tumour, about a month after his admission, and one taken just the morning of his discharge, show a very evident diminution in its bulk; while, in a letter which I have recently (24th May, 1869) received from my former house-physician, Mr. Frank H. Hodges, he says—"I called on Peter Reid on the 28th of April, and found him in a very satisfactory condition, the tumour had considerably diminished in size (since his discharge), he was quite free from cough, and went out for a constitutional daily."

The next case is not so decidedly one of aneurism, but it is at all events one of aneurismal dilatation of the aorta, with diseased coats, and affords very evident proof of the relief obtained even in such cases from the treatment recommended.

CASE XXII.—Thomas Moody, æt. thirty-nine, a slater, from Cross-gates, Fife, admitted to Ward VII. on 11th July, 1868. He stated that for sixteen months he had been complaining of severe pain across the upper part of the sternum, and a sensation of breathlessness. On examination, dulness was found to extend across the whole of the upper part of the sternum. The cardiac dulness was normal, or very nearly so, apex beat between the fifth and sixth ribs. The first sound healthy, the second wanting, and replaced by

a double bruit, loudest during the diastole, as heard at the aortic cartilage. This double bruit was propagated upwards along the arteries, but the systolic part of it was heard markedly louder and rougher over the left carotid artery than anywhere else. The finger pressed deep into the tracheal fossa came in contact with a pulsating body. The other organs and systems were natural.

R Pot. iodidi, 3 vj.

Infusi. chirateæ, ʒvj. Solve.

Sig., ʒss. ter in die. To remain in bed, and to restrict himself somewhat in regard to his food and drink.

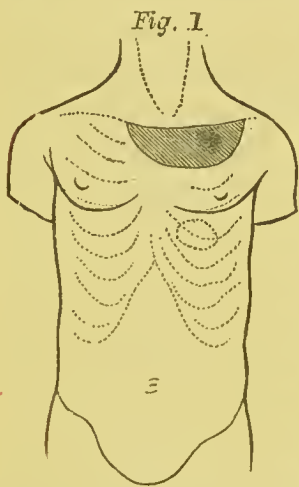
The patient very speedily expressed himself as greatly relieved; in a fortnight the rasping bruit over the left carotid was found to be much softened, the pulsation in the tracheal fossa was still perceptible, but not so much so as formerly, and he was discharged, at his own request, on the 3rd of August, 1868. There was in this case no history either of rheumatism or syphilis.

The next case, on the other hand, is not only a very well-marked but also a very remarkable case of aneurism of the aorta, one which even taken singly would be sufficient to attract attention to the treatment propounded, but which, when regarded as only one of a series, provides indeed a very forcible illustration of the good effects to be derived from it.

CASE XXIII.*—Andrew Jamieson, a carter, aged forty, admitted into Ward II. under Professor Bennett's care, January 31st, 1868. About eighteen months ago the patient had an attack of pleurisy in his left side; with this exception, he has been always healthy. About twelve months ago, without any known cause—as he is not aware of having strained himself in any way, though constantly in the habit of lifting heavy weights into his cart—he first felt a severe and constant aching in the left side of his chest, over a spot about the size of a crown-piece, situate about two inches above the nipple. This pain was much increased on making any exertion or on stooping. To relieve it he applied several mustard poultices, and took cod-liver oil, without, however, deriving any benefit. Notwithstanding the pain he suffered, he continued work up to July 1867, but he was then compelled to give it up entirely on account of his sufferings. The pain was now more severe than ever; his

* The history of this case is partly condensed from the Clinical Records of Ward II.

breathing short and wheezing; he had a troublesome cough, worse on making any exertion; he experienced a choking feeling when he stooped, and he felt a difficulty in swallowing any solid food, which seemed to stick opposite the upper margin of the sternum. His voice also now became weak and somewhat hoarse—*vox anserina*—and he felt a disagreeable pulsation in his chest. For these symptoms he unavailingly sought relief in the Glasgow Infirmary, and finally came to Edinburgh. Up to the period of admission the pain had spread very much over the upper part of the chest, but he does not think that the other symptoms had increased; he has never had any headache or hæmoptysis. The pulse at the left wrist is almost imperceptible. The right pulse is 84, of moderate strength, and slightly jerking. Cardiac dulness, not noted. The heart's apex beats three inches below, and a little external to the nipple line. Only the first sound is heard at the apex; both sounds are heard at the base normal. Over the upper part of the left side of the chest, anteriorly, there is a distinct bulging, most marked over the second rib and second intercostal space. Over a spot, about the size of a crown-piece, there is a distinct impulse communicated to the stethoscope; over the left side, there is dulness on percussion from the clavicle to within two inches of the nipple line, extending across to the opposite sterno-clavicular articulation. (*Vide fig. 1.*)



Over this dull area a double blowing murmur is to be heard; "the second sound, however, being very feeble, and heard most distinctly over over the sternum, opposite the articulation of the second rib, also heard over the great vessels at the root of the neck."* At the right apex the inspiration is harsh and the expiration prolonged; over the left apex, anteriorly, the double murmur referred to completely obscures the sounds of respiration, which are everywhere else normal. The patient has a very loud and frequent cough, of a clanging metallic

character, without expectoration. He complains of severe dull aching pain on the left side of the chest, from below the clavicle to

* I here give the *ipsissima verba* of the report. The second sound refers, I believe, to the diastolic blowing heard over the tumour, but the expression is ambiguous.

the level of the nipple; this occasionally extends to the right side. He gets only occasional short snatches of sleep, owing partly to the pain referred to, and partly to the frequent recurrence of a choking sensation referred to the throat. His tongue is clean, appetite bad, but bowels regular. Urine sp. gr. 1.030, with deposit of urates, but otherwise normal. There is a slight puffiness of the integuments over the upper part of the sternum, and the veins over the dull area are visibly enlarged. He was ordered steak diet (Royal Infirmary diet tables), and

Rx Tinct. ferri perchlor., ʒj.
Aque, ʒvj. M.

Sig., One tablespoonful three times a day.

February 4th, the patient continues much the same as on admission. He still chokes on his food, and requires a "drink to wash it down." His cough and spasms of choking are very violent, and of frequent recurrence. Ordered to take fifteen minims of sulphuric ether in water, when the cough comes on. 12th of February, pain and cough both worse; ordered—

Rx Tinct. camph. co., ʒj.
Mucilaginis, ʒj. M.

Sig., ʒj. pro dose, *pro ré nata*.

He continued not certainly improving till the 17th of February, when it is stated that the "pain is better than it has been; slept two or three hours in the night. Complains of difficulty of breathing, much worse if he makes the slightest exertion. Pulse 100, of moderate strength; ordered—

Rx Potassii iodidi, ʒij.
Aque, ʒvj. Solve.

Sig., Two tablespoonfuls three times a day.

Next day, 18th of February, the pain is said to be not so bad as it had been; the pulse was 88, and of moderate strength; the cough and dyspnœa still continued. He was ordered to take fifteen minims of chlorodyne in water at bedtime. On the 22nd of February it is reported that he did not cough so much last night, and that the pain no longer passes across the chest, but is confined to one spot, the size of a crown piece, between the clavicle and nipple; the pulse is 84, and of moderate strength. On the 3rd of March, it is reported that the cough was more troublesome during the previous night, and that he complained of slight soreness across the lower part of the chest on coughing. Ordered to discontinue

the iodide of potassium mixture. On the 5th of March, the patient was ordered full diet instead of steak diet. On the 10th of March, his cough becoming very troublesome, he was ordered—

Rx Sp. chloroformi, }
 Chlorodynii, } $\text{āā } 3 \text{ iv.}$
 Aquæ, ℥ vss. M.

Sig., One tablespoonful when the cough is troublesome.

The patient says the pain is worse in the left side of the chest to-day. He thinks it has not been so well since he left off the iodide of potassium. Ordered to recommence his mixture, taking only one tablespoonful three times a day, so that he now gets only ten grains of the iodide for a dose. He continued much the same, not complaining of the pain till the 21st, when he was ordered to discontinue the iodide of potassium mixture. On the 23rd of March, it is reported that the patient says he cannot see distinctly when reading or writing, as if a mist came before his eyes; he has noticed this since the 19th. On the 31st of March, he was ordered to apply pounded ice, in a bag of thin gutta-percha, over the pulsating tumour, on the left side of the chest, for one quarter of each hour during the day. On the 16th of April the cough was rather worse, and he was ordered to resume the iodide of potassium, in twenty-grain doses three times a day. At this date, the dimness of sight formerly complained of is reported better. On the 24th of April, the iodide was again discontinued, because of slight watering and weakness of the eyes. On the 28th of April, it is reported that the cough recurred with great violence during the preceding night, with great difficulty of breathing, loud snoring noise heard over all the chest posteriorly, with a rattling in his throat; no dulness posteriorly, vocal resonance increased equally on both sides, Ice to be discontinued. Ordered to recommence the iodide of potassium in twenty-grain doses three times a day. On the 29th of April he was ordered—

Rx Spt. æth. sulphurici, ℥ iij.
 Chlorodynii, ℥ ij.
 Decoct. senegæ, ℥ vj. M.

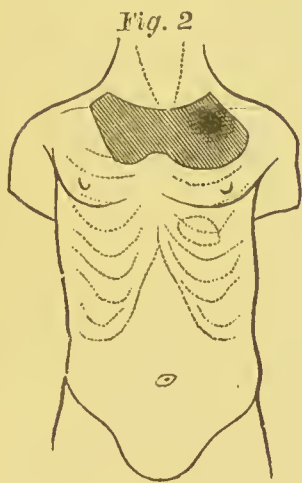
Sig., One tablespoonful when the cough is troublesome.

April 30th, the breathing is said to be not so difficult, his cough continues, the expectoration frothy and purulent. On May 8th, it is stated that the area of dulness remains unchanged; the sounds heard over it are, however, much diminished in intensity, and the blowing is scarcely audible. Percussion over the lungs is normal,

but loud sonorous râles are everywhere audible, with prolonged expiration, especially on the right side posteriorly. The cough is not so harsh and barking as formerly, but it is now accompanied by a most copious purulent expectoration, especially at night. All his medicines to be stopped except the iodide mixture, and the following draught:—

R Chlorodynii, ℥x.
 Spt. æth. chlorici, 3 ss.
 Mucilaginis, 3 j.
 Aquæ, 3 x. M.
 Ft. haustus nocte sumendus.

On the 22nd of May, he was ordered a hot poultice, on account of a soreness in the chest, most felt after coughing. 9th June.—Since last report he has continued much the same. He sometimes complains of pain in the chest, still has cough, with profuse purulent expectoration, and loud sonorous râles, both anteriorly and posteriorly. He still continues to take the sedative draught and the iodide mixture. Upon percussion, the dullness is found to have extended more towards the right side, now reaching to about the middle of the clavicle. (*Vide fig. 2.**)



On 23rd June, it is stated that the patient complains of great pain in the chest, which seems to be increasing, and for which he had poultices frequently applied. He also complained of great weakness, for which he got two ounces of port wine daily. His breathing was however easier, the cough and expectoration greatly diminished. The pulsations over the now greatly enlarged dull area are however increased, and the double blowing murmur is more distinct than formerly. Posteriorly, the blowing murmur can also be distinctly heard about the sixth dorsal vertebra. 26th June.—Complains of pain in the left side being increased. Poultices ordered. 27th June.—Still complains of great pain in his left side. Twenty minims of a solution, containing nine grains of hydrochlorate of morphia

* Figures 1 and 2 have been accurately copied from drawings made at the time by Dr. Bennett's clerk. The dark patch points to the place where the red projection subsequently to be mentioned was thrown out.

to the ounce, were injected subcutaneously over the painful part. He continued to improve slightly. On 16th July, it is stated that the patient feels very well, has little cough or expectoration; he takes his food well, and has very little pain. On 23rd July, it is stated that the patient continues better, his breathing easier, cough and expectoration almost gone, and for the last two or three days he has been getting up and walking about the ward, though unable for any exertion, or even for much gentle exercise. He continues the iodide of potassium. At this time, Ward II. being shut for the autumn, he was transferred to my care in Ward VII. Shortly after being sent up to me, he walked through the whole ward to the water-closet, which is somewhat draughty, and back again, and was thereupon seized with a return of his cough, copious purulent expectoration, and violent pain in the left shoulder, and over the large pulsating tumour, on the left of which a small projection about an inch square was thrown out, over which there was a red blush. He was strictly confined to bed, a belladonna plaster applied over the tumour, with half a drachm of the iodide of potassium in infusion of chiretta three times a day, also,

Rx Syrupi scillæ, ℥ij.
 Spt. lav. co.
 Tinct. opii ammoniatæ, } aa ℥iv.
 Syrupi simplicis, ℥j.
 Aq. menth. piperitæ, ℥ij. M.

Sig., One tablespoonful every three hours, and fifteen minims of chlorodyne to be given additionally when required.

In a few days he was relieved. The projection subsided, and he seemed going on favourably, but the annual cleaning of the wards then came on, and on the morning of the 13th of August, he was unfortunately permitted to walk down two stairs, each one storey high, to Ward No. I. This, however, he seemed to bear pretty well; he expressed himself as none the worse, but his cough was most certainly not improved. Upon his return upstairs, a week subsequently, I had him carried in a chair, but the exertion, and possibly the somewhat damp air of the newly-washed ward, were too much for him; a violent exacerbation of his cough took place, accompanied by a great increase in the size of the tumour, which was covered by a red blush; there was complete loss of the pulse in the left arm, accompanied by coldness and excruciating pain of the limb; his expectoration was copious and purulent, and occasionally both streaked and stained with blood. His left arm was ordered to be swathed in flannel, and he to continue his cough mixture, to have also

fifteen minims of chlorodyne *pro ré nata*, to have his iodide mixture four times a day, and to have a large belladonna plaster applied over the whole tumour. For many days he took two drachms of chlorodyne daily, besides his cough mixture,—indeed, the orders were to give him a full dose of chlorodyne at once when required, so as at all hazards to keep the cough quiet. He bore this treatment well, his tongue kept clean, and his appetite fair; in eight days the expectoration began to lessen, and the cough and pain to cease. By the 31st of August they were almost gone, and the expectoration reduced to a trifling amount of mere mucus; the arm was again warm, and feeling like itself; the pulse restored to the wrist, though still very feeble; the tumour somewhat diminished in size, and apparently not pulsating so strongly; he was lying quietly in bed reading, and expressed himself as feeling quite a new man. After this he was kept constantly lying on his back in bed for the next nine months; for the greater part of this he was on a water-bed; he had occasional relapses of his cough, especially during the changeable weather of autumn and early winter, for which a tolerably free use of chlorodyne or other opiate was required; but there were no more threatening symptoms in regard to the aneurism, which continued steadily but slowly to improve. During all the next nine months, he continued to take two drachms of the iodide of potassium daily, with the exception of twice, when it was omitted for a day or two on account of gastric irritation, as evinced by pain and vomiting. At last, towards the end of May, the tumour seemed sufficiently consolidated, and all the other symptoms so moderated, as to warrant the patient's being allowed to get out of bed. Although he looked well and healthy, yet I considered it proper to prepare him for his exertion, by adding one drachm of the iodide of iron to his iodide mixture; this he took from the 18th to the 21st of May, when he was allowed to get up; the iodide of iron continued in combination with infusion of calumba, and the iodide of potash omitted. I find I have omitted to state, that when I first made up my mind to allow Jamieson to rise finding his pulse rather more rapid than I liked, which I now believe was partly the result of a fearful joy, I put him for several days upon gradually increasing doses of tincture of aconite, along with his iodide mixture; this having been pushed as far as I thought proper, without any decided lowering effect, I then placed him, as I have just stated, upon the iodide of iron. At this time his pulse was 100, much fuller in the right arm than in the left; the

skin moist ; his cough so slight as to be inappreciable, never heard during visit ; his expectoration merely a trifling catarrhal mucus ; his voice still thin, and somewhat feeble, but distinct, and very different from what it was ; respiration everywhere natural, and the percussion sound posteriorly normal. Anteriorly, the apex beat is feebly felt between the sixth and seventh ribs, a little outside the nipple line, the heart being probably elongated, and certainly displaced, the lung covering it. Just inside of the left edge of the sternum, dulness extends from the liver quite up to the lower border of the first rib. In the nipple line, dulness extends transversely to a distance of two inches from the edge of the sternum. Just at the inner edge of the left clavicle, there is a small patch of clear sound ; with this exception, dulness extends along both clavicles, from about one inch and a half to the right of the right edge of the sternum, to about four inches to the left of its left edge. The dulness on the right side is bounded by a semicircular line joining the sternum at the upper border of the second rib. On the left side the dulness is also bounded by a semicircular line, the centre of which is about the middle of the clavicle, and in this position it does not descend beneath the middle of the third rib. The sternal ends of both clavicles are dislocated, the right to the extent of half an inch, the left to about a quarter of an inch, on the upper part of the sternum ; there is considerable puffiness, and over it, and over the dull portion to its left, the veins are enlarged and tortuous. A finger placed in the tracheal fossa feels a solid mass behind the sternum. Over the apex beat, the first sound of the heart is audible, somewhat obscured by a rough double bruit, heard loudest at the middle of the sternum, just at the junction of the fourth rib ; this is propagated upwards loudly and roughly into both carotids ; less so into the right subclavian ; while over the left subclavian, in the dull portion already mapped out, we have a solid tumour, pulsating, but not very forcibly, and only with a movement of elevation, and none of dilatation, over which no bruit whatever is heard, merely a dull thud. The patient has now no difficulty in breathing or swallowing : he walks up and down stairs, and about the airing ground ; he says he has now no cough. The aneurism seems still going on consolidating. I have again placed him for precaution's sake upon the iodide of potassium, but he is now ready, and I believe fit, to be discharged. I shall, however, protest against his testing his powers of procuring a livelihood for himself by a return to a laborious occupation. I sent this patient recently

down-stairs to Dr. Bennett, who exhibited him to his class, and, I am told, expressed himself satisfied with the reality of the improvement which had taken place.

Jamieson was shortly after discharged. He went to the work-house, where he remained till November 1st, 1869, when he was re-admitted into Ward V. for some catarrhal symptoms. His aneurism remained in *statu quo*. A thick œdematous collar full of tortuous veins, had developed at the lower part of the neck and over the upper part of the sternum. He was discharged in April, 1870, and went to Glasgow, where he remained much the same; the last time I heard from him is now some months since.

This very interesting case affords an instructive example of how much may be done by appropriate treatment, even in the most unfavourable cases of aneurism. And it speaks well for the treatment under consideration, that it was capable of relieving symptoms so severe as those of Jamieson, and of prolonging life in circumstances so apparently hopeless.

CASE XXIV.—William Allison, aged twenty-two, a tailor from Glasgow, a native of Dumfries, was admitted into Ward VII. on the 3rd of August, 1868, labouring under severe cough, with copious purulent expectoration, having also a pulsating tumour in the left breast. He is a thin, worn-looking man, and states that he has been nine months ill, having already sought relief in the Glasgow Infirmary for a severe cough and pains in the left side, especially in its lower part. There he was under Dr. Steven's care, who discovered the aneurism, the existence of which was unknown to the patient. No special treatment was used for the aneurism; his strength was supported, and cough soothed. He remained in the Glasgow Infirmary from the 7th of March till the 20th of June, when he was discharged, improved as regards his cough, to the Convalescent Hospital at Bothwell. From thence he went to Dumfries, where he became worse, was advised to come to Edinburgh, and was sent to me by Dr. Joseph Bell, whom he had consulted. On admission, he was found to be exhausted by a constant harassing cough and copious purulent expectoration. He had also suffered much lately from severe pains in the left side of the chest, extending over the shoulder and down the left arm to the elbow, also up the left side of the neck to a limited extent. Pulse 110, rapid and feeble. Apex beat between fifth and sixth ribs, and slightly to the left of the nipple. The cardiac dulness does not, however, seem increased. The heart seems rather pushed

to the left, and somewhat backwards. The heart's sounds are normal, but fainter than natural over the apex; the second somewhat accentuated at the base. Between the second and third ribs on the left side there is a conical elevation, rising about half an inch above the level of the ribs, pulsating fluidly, with thin walls and a distensible action. This pulsating tumour measures transversely about an inch and a half, while another inch and a half of dulness extends to the edge of the sternum; it passes upward to the lower border of the first rib, and below it is lost in the cardiac dulness. Over this region the pulsatile wave passes from right to left, and a tolerably loud and well-marked bruit is to be heard, terminated by the accentuated thud of the closure of the aortic valves. This is most distinct close to the sternum; more to the left this thud appears to be replaced by a second blowing sound. The right lung is normal both as to percussion and auscultation; the left lung is dull anteriorly, and over its lower half posteriorly, the respiration being obscured apparently by thickening of the pleura (the remains of an old pleurisy which he had in Glasgow), sonorous and creaking râles being heard there, as also over the apex. Right pulse perhaps a shade fuller than the left. Pupils both natural. To have a belladonna plaster applied over the tumour, and

Rx Morphiae hydrochloratis, gr. j.
 Acidi hydrochlorici dil., ℥v.
 Acidi hydrocyanici dil., 3 ss.
 Syrupi scillae }
 Aquæ fontanæ } áá 3j. M.

Sig., One teaspoonful occasionally.

Rx Potassii iodidi, 3 vj.
 Infusi chirate, 3 vj. Solve.

Sig., One tablespoonful three times a day.

The pain ceased in a few days. By 1st September the cough was almost gone, the sputa nummular but scanty, his breathing easy, and he felt altogether more comfortable. His pulsating tumour scarcely projected at all, and felt somewhat firmer in its walls; his pulse 96. By 30th September the cough and expectoration had both entirely ceased, and on 30th October he left, thinking himself quite cured. The pulsating tumour was lessened, but its walls were not thickened, and the bruit as loud as ever. About a month afterwards, I had a note from him requesting re-admission, which I granted, upon condition that he should agree to confine himself to bed for six months at least, and upon 10th November he was re-admitted at his own urgent request. His cough

was now very harassing, and he expectorated about $\frac{3}{4}$ xv. of purulent matter during the night alone. He was placed on his former remedies, but on the 23rd of November he said that he vomited the iodide. He was ordered to continue the iodide mixture as formerly, but to have ten minims of chlorodyne *pro ré nata*, instead of his cough mixture. 24th November.—It is reported, “no more sickness.” On 28th November he was so exhausted with his purulent expectoration that I was forced to give him four ounces of brandy in the day. At this date his right lung was found to be normal. On the left side anteriorly there is complete dulness everywhere, except at two points—*first*, just below the left clavicle, and for about an inch from the sternum; there the dulness is not quite complete: *second*, there is a patch of fully resonant lung, bounded above by the clavicle; anteriorly, by a perpendicular line from the centre of the clavicle to the upper border of the third rib; posteriorly, by the anterior fold of the axilla, down to where this joins the fifth rib; and inferiorly by a semicircular line joining the two inferior points. The apex beat is between the fifth and sixth ribs, two inches to the left of the nipple, and one inch and a half below it. The heart sounds distant but normal, at least free from bruit, at the apex. The base is so covered up by a large pulsating tumour that the sounds proper to it cannot be distinguished. This tumour pulsates visibly and fluidly between the second and third ribs, commencing immediately within the line bounding the resonant space just mentioned, and extending to the sternum; the pulsatile and distensile wave passes from right to left, and seems to follow the heart's impulse very closely; the interval being distinct, though brief. Over the whole dull portion of the chest anteriorly—chiefly, however, heard where the pulsatile tumour exists, and specially well marked close to the left edge of the sternum—there is a loud bruit, seeming to follow the loud accentuated second sound, and there is also a thrill most evident at the close of the pulsatory wave. Laterally the percussion sound is somewhat dull. Posteriorly there is no dulness above the centre of the scapula; beneath that the dulness is well marked. Anteriorly, over the sonorous patches, there are moist rattles and creaking sounds. Posteriorly, as low down as the middle of the scapula, the respiration is normal, with a few rattles; no vocal resonance. Beneath that the vesicular respiration is faint, almost inaudible, and masked on deep inspiration by coarse crepitation. From the fourth dorsal vertebra, as low down as the seventh, and for four

inches to the left of the spine, the pulsation is distinctly audible, but no bruit.

By 24th December his cough and expectoration were quite gone. He was looking well, gaining flesh, and the pulsations were much quieter. By the 26th of March he was so much recovered, and the pulsation so quiet, the walls feeling so solid and dense, that I ventured to express a hope that I should soon be able to let him out of bed. Unfortunately, that very afternoon, he rose without leave, and left the hospital. Of course, upon his return, he was very properly dismissed for his misconduct by the house-physician, and I heard nothing of him. August 1869, Allison was re-admitted into Ward V., his aortic symptoms being similar to those already described, while his lung symptoms were much aggravated, and there he remained, getting gradually weaker till his death on the 27th May, 1870. He was always an unmanageable patient, and reaped but little benefit from treatment. He died from exhaustion (*asthenia*), consequent on the copious suppuration of the left lung. At the autopsy, on the 30th May, the aorta was found much dilated and atheromatous, an aneurism the size of a cocoa nut was found to extend from just above the aortic valves to the commencement of the descending portion of the arch, occupying the whole circumferences of the aorta. The aneurism consisted of two sacs, the one bulging anteriorly and in the concavity of the arch, the other posteriorly. The two sacs were separated internally by a groove corresponding to the convexity of the arch. The coats of the sacs were calcareous, the interval between them comparatively healthy. A firm decolorized clot, two and a half inches long by two and three-quarters broad, occupied the anterior sac. The descending aorta curved abruptly from the aneurism by a circular opening the size of the normal aorta. The right lung was healthy; the left lung greatly atrophied, condensed, collapsed, and filled with suppurating cavities. The liver weighed seven pounds fifteen ounces, and was firm and waxy. The spleen weighed fourteen ounces, and was waxy, the malpighian bodies notably so. The kidneys were also waxy, but not remarkably so; they were also somewhat fatty. The intestines were glued together by lymph recently effused; the colon was greatly distended. The two sacs of this aneurism, of which the left was the largest, communicated so freely, that it was only anatomically, and by reason of being separated by the healthy patch of aorta, that they could be called two. There was a large bulging to the left, and a smaller one to the right, or rather more anteriorly. It seems impossible to

account for the diastolic character of the bruit, which was distinctly recognised by Dr. Steven of Glasgow, under whose care he was before coming to Edinburgh, unless we suppose the sac to have still retained some contractile force, and to have thus produced it by its own systole. Some support is given to this view by the fact that the thrill was most marked at the subsidence of the systolic wave. As to the singular delayed character of the impulse which followed that of the heart by a distinct though brief interval, there can be no doubt that this phenomenon, so rare in aneurism, was caused by the large size of the sac, and the very rough character of its interior—roughness of the interior of an aorta always delaying pulsation,* though it can only but rarely do so in an aneurism situate close to the heart as in this case. The beautifully distinct wave passing across the sac to its full impulse was evident proof of the delay the blood experienced in its passage through the sac.

The next case is certainly not one of aneurism, but it seems worth relating as a very good illustration of the relief to the sub-sternal pain and many of the other troublesome symptoms, even in cases where we have to do with nothing more definite than the aneurismal diathesis.

CASE XXV.—Robert Sawyer, aged thirty-two, came from West Calder to Ward VII. on the 8th of August, 1868, complaining of violent palpitation, severe pain over the cardiac region, difficulty of breathing on walking, accompanied by a feeling of suffocation as if the throat were grasped. On going upstairs he has to stop repeatedly to recover his breath. The heart's apex is found to beat between the fifth and sixth ribs, a little to the right of the nipple line. The cardiac dulness is normal. The systolic sound in the mitral area seems a little more intensified than usual; there is no bruit. The diastolic sound over the aortic area is greatly intensified, has a loud booming character, and is accompanied and partly replaced by a diastolic bruit, heard loudest over the sternum from the fourth rib down to the ensiform cartilage. There is dulness and some venous vascularity over the upper part of the sternum, and a rough bruit in the left carotid. Palpitation first troubled him, he says, after an attack of rheumatic fever, sixteen years before. There is no history of any cardiac affection; he has, however, had repeated attacks of rheumatic fever during the eleven years immediately succeed-

* Oppolzer, "Vorlesungen," 1867. Erster Bd. Zweite Lieferung, s. 278, &c.

ing his first attack, but none during the last five years. On admission, he was ordered half an ounce of infusion of digitalis thrice a day. This he took for five days without any relief. He was then ordered half a drachm of the iodide of potash in infusion of chiretta, three times a day. He very soon lost the substernal pain and other uneasy feelings, and was discharged, at his own request, on the 10th of September. I ascertained that he had run up and down the infirmary stairs to test his improvement, and he expressed himself satisfied when he requested his discharge.

The following case presents a well-marked example of innominate aneurism successfully treated:—

CASE XXVI. — Henry M'Neminy, aged thirty-seven, a labourer, a native of Ireland, but for twenty-six years an inhabitant of Scotland. Admitted into Ward VII. on the 31st of August, 1868. He states that he was in good health up to last winter, when he caught a severe cold; about three months since he first perceived and was incommoded by a beating in the throat, and about three weeks ago severe pains commenced to shoot from the place where the beating is felt over the right shoulder down to the right arm, and especially up the right side of the neck and back of the head. For these pains he consulted Dr. Joseph Bell, by whom he was sent to me. On the right of the tracheal fossa there is a tolerably firm, but distinctly expanding, pulsatile tumour felt rising out of the chest, about an inch above the upper edge of the sternum, crossing fully one-half of the tracheal fossa, being nearly two inches in diameter. From the upper edge of the sternum, dulness extends downwards for about an inch; over this dull spot and tumour a dull thud is heard, no bruit; this thud is propagated up both carotids, while in both subclavians merely the normal arterial whiz is to be heard. The cardiac dulness and sounds are natural. The right pulse seems a little smaller than the left, and the right pupil is slightly contracted. Other systems and functions natural. Pulse, 120 on admission. He was ordered at once half a drachm of the iodide of potassium in infusion of chiretta, three times a day. In three days his pulse had fallen to 88, and he continued steadily to improve up to the 25th of November, when he was dismissed, at his own request; the tumour quite firm and solid, no longer dilating, but not perceptibly diminished in size. He was perfectly free from pain and every aneurismal discomfort, and expressed his determination not to go to work for a few days.

Dr. M'Bain wrote me in May, 1869, that he was then working as a scavenger without inconvenience; that there was still excessive pulsation, but that the tumour had almost disappeared. On the 15th of February, 1871, this man was exhibited to the Edinburgh Medico-Chirurgical Society. The tumour, still firm and solid, was then perceptibly diminished in size, scarcely projecting above the level of the sternum, while the man was strong, healthy, and free from every discomfort.*

I may here mention that within the last year and a half I have successfully treated in a similar manner four other cases of innominate aneurism, which it would be superfluous to relate more particularly. In three of these cases the cure seemed to be considerably expedited by the external application of iodine liniment over the tumour, which was ultimately reduced to the dimensions of a somewhat dilated but firm and no longer distensile artery. The aorta was implicated in one at least of these aneurisms, and in the fourth it was so much so as to constitute the more serious part of the disease. Nevertheless, the last time I saw him the tumour was firm, and the distensile pulsations had ceased. In the diagnosis of innominate aneurisms, it is right to remember that even in the normal condition it sometimes divides considerably above the clavicle,† and then when only moderately dilated it simulates an aneurism very efficiently; while in one case, in which after death the artery measured only one inch and three quarters, and did not appear to be anormally dilated, the appearance of an aneurismal tumour was so efficiently simulated, that Mr. Annandale was consulted as to the propriety of operative interference.‡ Such a case would probably have been rapidly cured by the external application of iodine. In the cases I have mentioned, the anormal bruits and the implication of the aorta in some of them, left little reason to doubt the actual existence of aneurism; at all events, in diagnosing the cases these various sources of fallacy were carefully considered, and rejected as insufficient to explain the phenomena present.

CASE XXVII. — Samuel Moore, aged forty-seven, an old soldier, now a stevedore. He was wounded in the Crimea, and was subsequently for nine years in India, where he

* "Edinburgh Medical Journal," April, 1871, p. 935.

† Quain's "Anatomy of the Arteries," London, 1844, Plate XX., fig. 3.

‡ "Edinburgh Medical Journal," February 1871, p. 739.

enjoyed the best of health, having during all that time only once had a week's illness. His habits are, however, confessedly intemperate. He was admitted into Ward VII. on the 14th September, 1868, and stated that he had caught cold from getting wet when working very hard at the quay of Glasgow, about seven weeks previously. A violent cough then came on, which had lasted four weeks, when, being seized with a violent fit of coughing while wheeling a barrowload of cheese from the ship's side to the quay, he felt a sudden pain shoot through his chest and down his left arm, which immediately began to swell. On admission, his right pupil was found to be slightly dilated, and the right radial pulse a shade weaker than the left. The left arm was swollen, measuring round the middle of the biceps twelve inches and a half, the right one only measuring eleven inches. The upper part of the left forearm measured also twelve inches and a half, the right one only ten inches and a quarter. The veins on the anterior part of the left chest, shoulder, and arm were tortuous and much enlarged. The apex beat was between the fifth and sixth ribs, directly beneath the nipple. The heart's impulse and dulness were normal, the dulness, however, extending to the upper part of the sternum, and entirely across it. The systolic sound in the mitral area was rather shorter and apparently not so full as usual. The diastolic sound in the aortic area was somewhat accentuated. A rough systolic bruit, closed by the accentuated diastolic sound, is to be heard in both carotids, but loudest and roughest in the right one. Pulsation is to be felt in the supra-sternal notch. Percussion over the lungs was natural, but loud sonorous râles were to be heard all over them. He had a violent cough and copious frothy expectoration. He had great pain shooting down the left arm, round the left shoulder, and up into the neck. Ordered squill and opium mixture, and half a drachm of iodide of potassium, in infusion of chiretta, three times a day. In this case the diagnosis of aneurism was at first somewhat obscure; the patient, however, improved under the treatment; the swelling of the arm, the enlargement of the veins, the cough, and the expectoration all gradually lessening, and the rough bruit in the right carotid becoming apparently softer. I had, however, ceased to look for any more definite signs of an aneurism, when one day, in the beginning of November, happening to place my hand upon his chest, I felt a well-marked pulsating tumour just to the right of the upper part of the sternum. Being hurried at the time, no careful examination was made

for a couple of days, but by that time the very evident and well-marked pulsating tumour, which was readily felt by myself and others, had ceased to be so easily perceived. There was, however, a dull patch between the first and second ribs, extending for about an inch and a half to the right of the sternum, and reaching from the upper edge of the second to the middle of the first rib. Over this dull patch pulsation was only very obscurely to be felt. The accentuation of the aortic sound was very well marked over the dull patch just referred to, preceded by a loud whiz, extending up into the right carotid and somewhat into the subclavian, but not well marked there even then. The aneurism seemed to be somewhat movable; because when pulsation was so evident to the right of the sternum, it was not so perceptible in the tracheal fossa, and *vice versa*. The swelling of the arm had quite disappeared, and all his symptoms were so much alleviated that he considered himself quite well. Unfortunately, he had to be dismissed for misconduct on the 28th of November. He has been since that time leading a life of alternate dissipation and medical treatment, not under my care, however; and on the 12th of June, 1869, he presented himself to me and besought me for re-admission. He then had a large pulsating tumour on the right side, about which there could be no mistake. I neglected to mention, that this patient had tolerably smart symptoms of iodism, pain in the head and coryza, when he first commenced to take the iodide, but a steady persistence in the half-drachm doses speedily established tolerance.

On his first admission the symptoms in this patient presented some obscurity, and many of those who saw him then were disposed to regard the swelling of the arm as due to the presence of enlarged glands, because of the apparent absence of all the more definite symptoms of aneurism. The very sudden manner, however, in which the symptoms occurred was conclusive to my mind against the theory of any solid tumour, and this coupled with the rough bruit loudest in the right carotid, led me to hold to the theory of aortic aneurism as being a more probable explanation; an explanation which the sequel proved correct. It is somewhat remarkable that while the bruit was loudest in the right carotid, the venous swelling was confined to the left arm. It seems probable that the aneurism arose from the upper part of the ascending aorta, just before the giving off of the innominate; that it was distinctly saccular, seated on the artery as it were by means of a neck, and

therefore mobile; and that it only pressed slightly upon the left innominate vein, so that the swelling of the arm was due to position, coupled with the effect of an obstruction so slight as not appreciably to interfere with the venous circulation of the head and neck, the return of the blood from which was favoured by position as much as that from the arm was hindered. The position of the aneurism when it did manifest itself, and its subsequent disappearance, are strictly consistent with this view. I may add that not long since I had occasion to see an aneurism, not known to be the result of accident, in which the primary symptoms were precisely similar, and the seat of the tumour when it did become manifest was exactly the same. This case had been treated on Valsalva's principles, with great temporary relief, but all the symptoms returned with returning strength. The iodide of potassium gave speedy relief to the pain, but I am not aware of the ultimate result of the case.

Moore acted up to his character, and kept loafing about the Hospital for a time. Latterly he has quite disappeared; most probably his disease has proved fatal.

CASE XXVIII.—William M'Alpine, a hawker, aged forty-one, admitted into Ward VII. on 1st June, 1868. This is the case referred to by Dr. Warburton Begbie, at p. 1071, "Edinburgh Medical Journal," for June, 1863. For about six years, therefore, he has been labouring under symptoms of aneurism, while during that time his symptoms have been relieved, and kept more or less in abeyance by the irregular use of the iodide of potassium, taken chiefly at his own hand. On admission, the percussion on the right side was found to be normal. On the left side, a dull patch extended from near the right side of the sternum to a distance of four inches along the upper border of the third rib, close to the left side of the sternum. This dulness extends upwards to the lower border of the first rib, while beneath it is lost in the cardiac dulness; towards the left, it rounds off semicircularly. The ribs over this patch seem to protrude. The cardiac dulness is normal, but no apex beat is to be felt. The cardiac sounds over the normal position of the apex are heard more distant than usual, the second sound is heard distinctly accentuated in its normal position. Over the dull area already described, the heart sounds are heard louder, and more accentuated than normally; no bruit is to be heard, but a distinct pulsatile movement is communicated to the ear, though it is not so perceptible by the hand. The right radial pulse is fuller and stronger than the left.

Pupils both alike. Posteriorly, on the left side, a distinct pulsatile thrill is communicated to the ear, but none is to be felt by the hand, nor does percussion bring out any appreciable dulness. The annoying sensation of pulsation is, however, only too perceptible to the patient himself, who says it prevents him leaning back upon a chair. A fine fringe of vascularity runs along the lower border of the thorax from one side to the other, and there is considerable oedema of the lower extremities and abdomen, which has existed for some time, and which he has been in the habit of relieving by purgatives. No appreciable ascites. Urine normal. To have half a drachm of the iodide of potash in infusion of chiretta, three times a day. To be strictly confined to the recumbent posture, and ordered to restrict himself both in food and drink. On the 29th of August, he expressed himself as much relieved, the distressing sensation of pulsation being no longer perceived by him. The oedema, however, troubles him much, and for this he had various purgatives, which ultimately relieved him. He was dismissed on 16th September, at his own request. He again returned on 26th September, for a cough, and remained in hospital till 23rd October, taking the iodide mixture as formerly. He was then dismissed at his own request, the pulsation now no longer perceptible to himself, and only very faintly perceptible on auscultation; the pulsation anteriorly over the tumour was also much less perceptible. Again he returned about the end of February, 1869, not now complaining of his aneurism, which remained in *statu quo*, but of intense oedema of the lower limbs and body, with some ascites, and also oppression of breathing. The upper limbs and face were comparatively free from swelling. There was no albuminuria, but purgatives and diuretics alike failed to give relief, and he was evidently sinking from the dropsy, and apparently had not many days to live, when he died suddenly, suffocated by hæmorrhage, which escaped from his mouth.

The autopsy took place on the 7th of March. The body was oedematous and extremely congested. The face was livid. Upon opening the thorax the sac of the aneurism was found firmly adherent to the left margin of the sternum, and to the third left costal cartilage. Opposite this point externally there was a slight elevation. The right pleura contained a large amount of reddish serum. Between the two layers there were several patches of dense old adhesions. The lungs were compressed, particularly the lower lobes. The left lung was densely adherent to the walls of the thorax and to the surface of the aneu-

rism. Part of the lower lobe of the right lung was also connected to the surface of the aneurism. The pericardium was greatly thickened. The heart was small; its cavities not dilated; the valves were competent. There was no marked pressure on the trachea, bronchi, or œsophagus. The branches of the arch of the aorta were atheromatous, but not compressed. Neither the pulmonary arteries nor any of the large veins were compressed. The coronary arteries were freely open, the aortic valves competent. The whole of the ascending part of the arch of the aorta had its inner coat atheromatous and calcareous. The middle coat was greatly thinned. The mouth of the aneurism was in the anterior wall of the aorta, about one inch above the valves. It measured three inches vertically, and nearly two inches across. The aneurism projected from its point of origin forward and toward the left side. Transfixed at its greatest breadth it measured four inches and a half, and from above downward five inches. Its anterior part contained firmly adherent fawn-coloured clots; its posterior part contained a large, softer, and more deeply coloured clot. On the same level as the aneurism just described there sprang another from the right side of the aorta, with an orifice about the size of a shilling, the whole tumour being about the size of a walnut. This second aneurism pressed upon the right auricle, the muscular fibres of which were much hypertrophied. The chief veins were free. There was slight flattening of the left vagus nerve on the surface of the aneurism. The liver was slightly cirrhotic, its surface studded with numerous miliary granules. The kidneys were natural. This small aneurism, which, doubtless, by its pressure on the right auricle, was the cause of the dropsy, and which, being continually churned by the greatly hypertrophied right auricle, could never be kept sufficiently at rest to induce the formation of a clot in it, was ultimately the cause of death, rupturing into the lower lobe of the right lung. The parts were exhibited at the meeting of the Medico-Chirurgical Society on 7th April, as an apt illustration not only of the mode of cure of an aneurism, but also of one of those conditions—and that not a common one—which too often render our best-devised plans of cure abortive.

The next case which I shall give is one which illustrates the effect of this mode of treatment in a rarer form of aneurism—weeping aneurism.

CASE XXIX.—Thomas Simpson, a cabman, aged fifty-eight, was admitted to Ward IX. of the Royal Infirmary on June 26th, 1869, on the recommendation of Dr. Joseph Bell.

The patient states that up to his thirty-fifth year he had been perfectly healthy. At that time, while attending a yeomanry drill, a carbine was fired close to him, which caused the horse he was riding to rear. The animal fell on the top of him, and crushed him. On being extricated, he was faint and unable to stand. On medical assistance being procured, no injury could be detected beyond a very severe bruise between the shoulder blades. This accident confined him to bed for three months, and for some time after he could not walk with his head erect. Even now, after a lapse of twenty-three years he cannot sit or stand for any time without feeling pain in his back between the shoulder blades. Five years ago he was thrown from a phaeton, and fell upon his head, fracturing both his clavicles. His habits are intemperate. He had never had rheumatism or syphilis, but has for the last six months been troubled with a cough and expectoration, which is mucous, containing blood. He has such an amount of dyspnoea on walking up a hill as frequently compels him to stop and rest.

On admission, his left pulse was found to be smaller than the right, 76 in a minute; his pupils both alike. The heart's apex beats between the fifth and sixth ribs, about half an inch inside the nipple. One inch to the left of the sternum, dulness extends from just above the fourth rib down to the liver dulness. In the nipple line (along the fourth rib) dulness extends from the left edge of the sternum two inches to the left. The left side of the chest in the mammary region is somewhat more prominent than the right. The heart's sounds are normal both at apex and base. The second sound seems to be somewhat accentuated in the right carotid, but decidedly so in the left close to the clavicle, and when the finger is pushed close into the tracheal fossa it comes in contact with a distinctly bulging and pulsating tumour just under the sternal end of the left clavicle. In the right subclavian there is a slight systolic bruit, followed by the second sound. In the left subclavian there is no systolic bruit, but the accentuation of the second sound is well marked. The percussion and auscultation of the lungs is normal. The blood in the expectoration is fluid, arterial, not frothy, and small in quantity. *Diagnosis*, a small weeping aneurism of the arch, implicating the immediate origin of the left carotid, and communicating by a minute opening with the left bronchus. *Treatment*,—

R Potassii iodidi, ʒvj.

Infusi chiritæ, ʒvj. Solve.

Sig., One tablespoonful three times a day, rest in the recumbent posture, and ordinary full diet.

On July 8th it is noted that the bruit in the right carotid has quite disappeared, while the second sound in the left carotid does not seem to be so greatly accentuated; the spitting of blood has ceased. But on the 9th of July, he spat up a few pellets stained with blood for the last time. After this he continued steadily to improve till his discharge on November 8th, 1869, all the aneurismal symptoms being much ameliorated and the dyspnoea gone. During last summer (1870) he was in another ward of the Infirmary, and I then ascertained that he had remained well, and that no trace of his aneurism could be detected. It is obvious that amidst all the difficulties which obscure the diagnosis of aneurism, especially one so obscure in its seat and so limited in its extent as this one was, this case must only be taken for what it is worth. The symptoms were, however, so fairly well marked, and the relief from treatment so great, that I think I am justified in regarding it as a proof of the efficacy of this treatment, even in aneurisms of this peculiar class.

I might multiply histories of aneurisms treated by the iodide of potassium, but I think a sufficient number has been given to illustrate the mode of treatment and the amount of relief to be attained. I have now treated after this fashion about twenty-five cases of aneurism, of whom the most of those not related were clearly cases of aneurism of the aorta, mainly of its thoracic portion, and all with a similar result, viz., speedy relief to pain and suffering of every kind, while in a few there has been so complete a subsidence of the tumour and relief to all the symptoms, as to amount to an apparently perfect cure. These results are extremely encouraging, and when we reflect upon the entire absence of any risk to the patient from the treatment, and the almost absolute certainty of relief to his sufferings, and prolongation of his life being at least attained, I think I am warranted in saying that no treatment for internal aneurism hitherto devised, holds out anything like an equal prospect of relief if not of cure, with that by the iodide of potassium.

To attain these objects fully, several circumstances must be carefully attended to, and the first of these is the dose of the remedy to be administered. In the cases related, the dose has varied from five grains to thirty, three or four times a day. In one case, ten grains thrice a day produced violent salivation, which ceased on a reduction of the dose to five grains; in another, twenty grains thrice a day seemed to produce violent diarrhoea, which also ceased on a reduction of the dose to five grains. In one of my own cases,

considerable coryza was produced at first, while the patient was taking only twenty grains thrice a day; but this rapidly ceased upon intermitting the remedy, and did not subsequently recur, though the dose was afterwards increased to thirty grains thrice a day, and continued many months. In my other cases, thirty grains twice a day or oftener were administered, without any ill effects, from the first; in some of them, however, pain in the stomach or head occasionally supervened, but was at once relieved by intermitting the remedy for a few days. Now, whether the action of this remedy consists in altering chemically the constituents of the blood, or in influencing in some unknown manner the vitality of the blood, or of the organs in which it circulates, it seems probable that it is in some measure proportionate to the quantity ingested, because the relief of pain, which is one of the earliest symptoms of amendment, is not produced till a certain efficient dose has been given. It seems therefore of consequence to attain that efficient dose as rapidly as possible, and whether it be that a large dose more readily establishes a tolerance of this remedy or not, there is certainly no evidence as yet before us to prove that this drug can be more safely administered by beginning with small doses, and gradually increasing them, than by commencing with full doses, as of thirty grains at once, intermitting them occasionally for a day or two on the occurrence of any symptoms which seem to call for this. In fact I have found that thirty grains given once in the day will produce iodism, where the same dose given three times has no such effect; and I always now give thirty grains three times a day, with a full opiate, or dose of chloral, at bedtime, with the certainty of at once inducing tolerance. This drug counteracts both opium and chloral, which require to be given very freely. In attempting to produce the specific action of iodide of potassium, saturation of the blood seems to be imperatively required by the rapidity with which the secreting organs, and especially the kidneys, remove it from the system—twenty-four to seventy-two* hours' abstinence from the drug having always sufficed to cause the disappearance of every trace of its presence from the urine. While the continuous administration of large doses may possibly in time succeed in saturating not only the blood, but even the tissues, at all events some such effect seemed to have been produced in

* The amount was always much lessened after twenty-four hours' abstinence; after forty-eight hours, there was a mere trace; and this had quite disappeared after seventy-two hours.

Case XVIII., in whom, in the latter months of his treatment, the application of a belladonna plaster was always followed by vesication and an eczematous eruption, although he had previously worn such plasters for many months without any ill effects, and it was only after this thorough saturation was attained that this patient's improvement progressed with any rapidity. From the apparent importance of this element of saturation, and the safety with which it can be produced in most cases, its attainment being evidently not necessarily connected with the development of any unpleasant symptoms, which occasionally then cease to appear, though they have been present at an earlier stage of the treatment, the proper procedure in all cases in which unpleasant symptoms arise, would seem to be not diminution of the dose, but temporary intermission of the drug,* and possibly, in some instances, its combination with some counteracting agent, such as opium. And I make this suggestion the more readily because, though large doses of this drug have unquestionably a greater tendency to irritate the gastrointestinal mucous membrane—an irritation which may be checked by intermitting the drug, or altering its mode of administration—other unpleasant symptoms, such as coryza, &c., do not seem to be necessarily connected with largeness of the dose, but seem referrible more to idiosyncrasy than to poisonous action. The only very severe case of coryza which I have seen produced in this manner has been apparently due to the trifling amount of the iodide contained as an impurity in a few drachms of the bromide of potassium—the bromide itself, I believe, producing no such effect.

In only two cases have I seen absolute intolerance of the remedy. In the one it produced rapid pulse and neuralgic pains of the abdomen, even when he did not know he was taking it. In the other, its use was so constantly followed by copious hepatic eruptions that it had to be given up. Iodide of sodium had the same effect. This was the more to be regretted as in both cases its action on the disease was markedly ameliorative.

As to the length of time during which this treatment ought to be continued, we have as yet no means of judging. Many of the cases I have quoted seem to point to a few weeks as sufficient to estab-

* Rosenthal, "Wien. Med. Halle," Vol. III., No. 20, 1862, and "New Syd. Soc. Year Book for 1862," p. 433, states that free dilution aids in removing the iodide from the system, and I can confirm his statement that, even when it has been given continuously for months, from twenty to seventy-two hours is sufficient to remove all trace of it from the urine.

lish a curative result, but this has not been my experience. A certain amount of relief may no doubt be rapidly attained, but any considerable amendment has only been procured after keeping the patient for many months persistently saturated with the drug; and I should not consider that this treatment had a fair trial, unless it had been carefully carried out for at least twelve months, while it is probable that the full benefit is not to be derived, in many cases at least, except by a steady persistence in its use for several years. But this treatment is of too recent introduction to say anything positive on this head.

In regard to the adjuvant treatment, there are one or two remarks which seem to me of considerable importance, and these may be comprised under the two heads of position and diet. Whatever is capable of lessening the frequency of the heart's action, without impairing the strength of the patient, or vitiating the quality of his blood, cannot but be an unimportant adjuvant in the treatment of aneurism. The enforcement of the recumbent position, therefore, which is so influential in this respect, has seemed to me a matter of paramount necessity, and has been strictly carried out in almost all of my cases; indeed, in the most serious one (Case XXIII.), the patient was laid upon his back for fully ten of the eleven months he was in my ward, not being permitted even to turn upon his side—any attempt to do so being always attended by a recurrence of his disagreeable symptoms. I have no doubt that the success attained in his case, as well as in others, was very considerably due to the long-continued perfect rest in the recumbent position; and in the treatment of so serious a disease as internal aneurism, I should consider it most unwise to neglect the employment of this simple but efficient mode of aiding the cure. No doubt the enforcement of this portion of the treatment is irksome and impossible of attainment without the intelligent acquiescence of the patient,* but I have not had any difficulty in obtaining this, on explaining my reasons and the object I had in view; and I may make the same remark as to diet. Aware of the evils of starvation on the one hand, and of plethora on the other, my patients were at first put upon a somewhat restricted mixed diet—fish being given for dinner, at first at

* Great relief is, however, is often obtained from this treatment without rest in the recumbent posture, and where it is desirable to prevent the patient from knowing his own condition this may be dispensed with, but I would not willingly do so in any serious case, and what ease of aneurism is not serious?

all events, as being the least nutritious form of animal food, while they were told voluntarily to restrain their appetite as much as possible, and to make use of no more than what they felt to be sufficient to maintain themselves. In regard to fluids, water, tea, or milk alone were allowed; and though they were not doled out in a measured quantity, yet similar directions were given in regard to them as in regard to solid food; explanations were given in regard to the result desired, and the evils to be avoided, and careful inquiries were daily made as to the mode in which these advices were being complied with, so as to impress their necessity and importance upon the patients. I have had no reason to be dissatisfied with the result of this reciprocal confidence between patient and physician, and I believe it to be more conducive to the well-being and the comfort of the former, than any more precise definition of amounts by weights and measures. The principles of the treatment were intelligibly laid down, and intelligently acted upon, and the effects daily noted, and the result has been that all of my patients have, without becoming plethoric, yet preserved a healthy and well-nourished appearance throughout the whole of their tedious treatment. Latterly, however, I have been less scrupulous in this respect, having had even better results when full diet was allowed; and while the unnecessary ingestion of fluids should be avoided, the iodide produces such free diuresis that this requires the less to be insisted on. Alcohol, however, in any form I have found to be certainly injurious, and its use should never be permitted, except where it is absolutely needful, and then only temporarily.

In regard to the mode of action of the iodide of potassium, I have already mentioned that Dr. Chuckerbutty supposes it to increase the coagulability of the blood, and that Dr. Roberts' seems to consider this a probable theory. The correctness of this idea is, however, doubtful; it might explain the coagulation of the blood in the aneurismal sac, but it could not explain the great relief to the pain, which is the almost immediate result of the ingestion of an efficient dose. Moreover, large doses of iodide of potassium relieve the pain of many cases of rheumatism, and the distressing spasm of asthma; in the latter disease, indeed, far larger doses have been given than that I have recommended—Dr. Aubrée having successfully treated several cases with doses of forty-five grains three times a day; *

* Trousseau's "Clinical Medicine," New Syd. Soc. Ed., Vol. I., p. 656: and in one case of long standing I myself have given six drachms in one day with perfect relief to the symptoms.

these are diseases in which increased coagulability of the blood is not likely to be beneficial, yet the relief to suffering in all of these cases is very marked, and, at all events, as regards rheumatism and aneurism, very similar in character. So far as I know, no one has hitherto attributed to the iodide of potassium sedative properties similar to those known to be possessed by the bromide; yet it is possible that it may act as a sedative to the nervous system, modifying its action in some unknown manner, and it is probable that its curative action in all these cases is due to this peculiar modification of nervous action—the coagulation of the blood in the aneurismal sac being the result of secondary causes. In Case XIX., this treatment produced an immediate and remarkable effect in lessening the fulness and force of the pulsations, not only in the tumour, but throughout the whole arterial system, and this not to our observation alone, but also as perceived by the man himself. This sedative action, which must have been exerted primarily on the nervous system, must no doubt favour greatly the coagulation of blood in an aneurismal sac; though not observed, it may have existed in the other cases, and it gives the only rational explanation of the peculiar effects of the iodide according to our present knowledge. In but few of my cases was the sphygmograph employed to record the force of the arterial pulsations, and thus to detect any deviations produced by treatment; I regret that nothing definite was thus ascertained.

I need hardly say that, notwithstanding the great and manifest relief obtained in almost all cases of aneurism by this treatment, positive cures can only be exceptional, of comparatively rare occurrence, and the result of long-continued and careful treatment. An aneurism may prove fatal in so many various ways besides rupture, that the mere coagulation of the blood within the sac is a comparatively small step towards a complete cure, though by no means an unimportant one. The relief obtained can only be regarded as unequivocally tending towards a cure, when, from the symptoms, it is apparent that the aneurism is not only becoming more solid, but also shrinking in all its dimensions; and even then incautious exertion may rupture the sac at some point where fluid blood may still communicate with the arterial canal, and death may thus ensue while the patient is flattering himself that he is being cured. Compression of important organs by the solidified sac may also induce dangerous and even fatal complications. And even under the most favourable circumstances, the occurrence of aneurism of a large and

important artery proves the existence of such a diseased condition of the arterial coats as will render the patient's life ever after a precarious one.

Notwithstanding the great relief to the symptoms in almost every case, it is obvious that anything beyond this—anything at all approaching to a cure—can only be expected in sacculated aneurisms, and chiefly in comparatively young individuals, and in cases more or less of a traumatic character, that is, produced by unusual exertion, as evincing a possibly less seriously diseased condition of the arterial coats than where the aneurism has occurred more gradually, and, as it were, spontaneously. On the other hand, when the aneurism has been of slow and spontaneous growth, these very circumstances, evincing as they do the existence of a greatly diseased condition of the arterial coats, would form unfavourable elements in estimating the probability or completeness of a cure; and the presence of more than one aneurism in the same person would seem likely to reduce still further the chances of anything beyond mere temporary improvement; but as the history of Case XX. shows, even in such cases this improvement may be so great as to be well worth all the trouble expended in attaining it.

In conclusion, I may state that being fully aware of the fallacious character of the argument from *post* to *propter*, which has been unavoidably employed in regard to the method of treatment now recommended, in a disease which, like aneurism, occasionally undergoes spontaneous abatement, I am by no means desirous of placing an undue value on the cases related or the results obtained. Nevertheless I think that these results fully warrant the commendation of this method of treatment I have already expressed, and I regard this as still further confirmed by the fact that in the hands of different observers, not all even of the same nation, whole series of cases have obtained a relief so great and well marked, as fully to entitle this method of treatment to a more extended trial by which its true value may be more correctly ascertained.

ON SYPHILIS.

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MODERN doctrines concerning the nature, and even the origin, of syphilis are continually changing. No sooner do we think that we have realised, in our mind's eye, some clear picture of the series of phenomena of this disease, than some new observer proclaims how that he has witnessed another series of facts to enrich the literature of the subject withal, and which, on investigation, prove to be revolutionary and unlooked for in their results. Such being the case, it cannot be deemed wrong in any one, if he desire, to go through a few of the moot points, and attempt to arrive at some conclusions, permanent or temporary. Both physicians and surgeons may now-a-days take a share in the debate concerning syphilis; for neither the one nor the other of these rather arbitrary divisions of the domain of medicine can be said to be likely to see the whole of the drama of syphilis played out, without caring to hear what the experience of the other is. In Paris, of late, this has been found so true, that physicians, instead of surgeons, now hold the majority of the posts in the venereal hospitals. Operative surgery of a formidable character is so seldom called for in cases of syphilis and gonorrhœa, that it has been found more rational to require a little surgical skill from the physicians of the hospitals of the Midi and Lourcine, than to employ an operative surgeon for patients in whose treatment, in the great majority of cases, drugs and hygiene are alone necessary. In all probability, opinion in this country will soon follow this example, especially as medical men are aware that, of late, some of the best monographs on syphilis have been written by gentlemen who, like Dr. Wilks, Sir W. Jenner, and Dr. Hughlings Jackson, do not occupy themselves with operative surgery, but are simply physicians.

ORIGIN OF SYPHILIS.

Somehow or other, men are never satisfied that they have a satisfactory idea of the causation of any virulent disease, until they are able to assert fearlessly that it has had its origin at some distinct recent, or far off, epoch : and is not liable, like typhus, to appear at any time, through influences which are continually at work where want is met with, and its hideous concomitants, over-crowding, female degradation, and abandonment of cleanliness and care of the common decencies of life. With all that has been written (and there has been no lack of research on this point) the author cannot confidently affirm that he has made up his mind as to whether syphilis existed among the ancient Greeks and Romans, or whether it was a new poison introduced into Europe at the end of the fifteenth century. From the medical works of Dr. Francisco Lopez de Villalobos, so well and cleverly translated recently by Mr. Gaskoin, we find that this Spanish court physician believed that the disease, which he describes as the "contagious and accursed bubas," arose in Spain in the reign of Ferdinand and Isabella. The year of the publication of the work of Villalobos was that in which, says Mr. Gaskoin, Charles VIII. died, after his tremendous raid into Italy ; five years had gone by since Columbus returned from America with the first announcement of his discovery ; and three or four years had elapsed since syphilis was notorious in Europe, viz., in 1498. It seems that Dr. Lopez de Villalobos was born in 1473, and should certainly be a good authority on that account. The year in which syphilis was declared to be epidemic is stated to have been 1494. Villalobos could then surely judge whether it was a new disease or not, as it is said that one-twentieth of the people of Spain were eventually attacked by it, and he was made physician to King Ferdinand, showing that he was probably an able man. M. Ricord says, with much truth and wit, that the origin of syphilis is like that of the Fine Arts, a mystery : and this is corroborated by the writings of some moderns. Captain Dabry, in a work called "*La Medecine chez les Chinois*," asserts that primary and secondary symptoms were well described in Chinese works on medicine ages before the fifteenth century ; and the *Sucrutas*, a Hindoo work, written about the year 400 A.D., is mentioned as existing in Hindostan, which gives descriptions of ozaena, and other syphilitic symptoms, occurring after infection of the organs of generation

Readers of Celsus will remember how phagedænic chancre of the penis is described, and treated by that physician by means of the actual cautery ; and Aretæus, in his work entitled “*Do Causis et Signis Acutorum Morborum*,” book III., chapter 8, says that in some persons the uvula is destroyed to the bones of the palate. And it is said that Marcellus Empiricus makes mention of “*ulcera tibiæ quæ intrinsecus serpunt*,” and which, it is contended, can only refer to syphilis, and to no other disease. Martial, in the seventh book of his Epigrams, speaks of a family as being *ficosa* in the following terms :—

“*Ficosa est uxor ficosus est ipse maritus.
Filia ficosa est, et genor atque nepos.
Nec dispensator, nec villicus ulcere turpi,
Nec rigidus fossor, sed non arator eget.*”

In addition to these quotations, we hear recently that Prescott and Irving in America have given it as their opinion that the Americans had received syphilis from, not given it to, the Spaniards under Columbus. So that, taking all things into account, must we not declare that the “origin of species” of syphilis is yet uncertain? Michel Scotus, in his “*De Procreatione Hominis Physiologia*,” written in 1477, shows, it is said, very plainly, the connection existing between affections of the genitals and the lepra of that period (an opinion in which Dr. Webster of London coincides) in the following sentence : “*Si vero mulier fluxum patiat, ut patet in adolescentulis, qui hoc ignorantes, vitiantur quandoque virgâ, quandoque leprâ.*” Are we to infer from this that syphilis has always existed? Truly, we are again in difficulties ; for, in 1496, there comes a decree of the municipality of Paris against persons affected with what was evidently considered to be a new disease, called the “*grosse verole*,” which had for two years prevailed in France. Dr. Lanceraux, on this latter account, seems not to believe in the view that syphilis was imported into Europe by the sailors of Columbus. And here we may leave this knotty point to some more fortunate historian of the Darwinian school, who may, perhaps, show how it was that syphilis all at once seemed to become epidemic and appalling all over Europe at the end of the fifteenth century. Fracastor, writing in 1546, gives a very good account of the way in which contagion was spread. He asserts that coitus was the chief agent in contagion, but admits that a considerable number of children became affected

by suckling diseased mothers or nurses. The disease showed itself, he says, in his work "*De Morbis Contagiosis*," sometimes one, two, three, or four months after contagion. Now that oceanic steam navigation has made the planet we inhabit comparatively well-known to us throughout, we are beginning to find traces of syphilis everywhere, and to understand that the names of "Yaws" and "Framboesia" in Africa, of "Sibbens" in Scotland," and, more recently, of "Radesyge" in Norway, all mean nothing more nor less than secondary and tertiary syphilis. Amboyna pimples, and the Pian of Nerac, which in 1780 appeared in St. Paul's Bay, Canada, are nothing more than this contagious disease, which committed great ravages among the savage Indian tribes. In their case, the disease seems to have been extensively spread by the lips, as we, indeed, frequently enough witness in London at present. In some other instances, as at Brunn, and at Nerac, the disease, when epidemic, has been transmitted by means of kitchen utensils, and linen, &c., much more than by coitus.

In Iceland, it is curious (if we are to believe the assertions of Dr. Hjaltelin) that this fell contagion has not been able to become established; and the same is reported with respect to the Faroe Islands; but, in Norway and Sweden, the disease is virulent, probably owing to the inclemency of the climate; and its treatment is eagerly debated by some of our most learned brethren in Christiania almost every year. In this country the disease is widely spread, especially in our army, which is composed of a number of grown-up men who are not allowed to contract any domestic ties. The consequence of this is that, in the home army in 1860, for instance, the amount of contagious diseases, including, of course, much true syphilis, was such as to account for the loss of 8.69 days of service per head; whilst, in France, during the same year, there was a loss of only 3.90 days per man from venereal diseases. Doubtless, this is owing in great measure to the fact, that concubinage is very prevalent in France among all the humbler classes, and not to the Contagious Diseases Acts of that country in any great degree, since there is but little venereal disease among our troops in the West Indies, owing to the fact that the native women there live maritally with the troops. Syphilis and like contagions are very prevalent in India, China, and Japan, and commit great inroads on the health of our celibate troops in these countries. New Zealand was free from the disease until Captain Cook's sailors imported it into the island, and in Tahiti this contagion at first caused immense damage to the

native population, although it is now much milder in that charming island. Dr. Livingstone contends that both syphilis and phthisis are unknown in Central Africa. Of course, wherever commerce has penetrated the disease is to be found. This is one reason why commerce is by no means an unmixed benefit to the human race. It appears that, in the Gulf of Guinea, syphilis is one of the most fatal diseases which males are subject to. Lancereaux thinks that it was reserved for the great epidemic of the fifteenth century to show, on a grand scale, the connection between the primary lesion and the secondary symptoms. He contends that the circumstances which in certain places appear to aggravate syphilis, such as want of acclimatisation, hard work, excesses, over-crowding, and, *perhaps* also, contamination from one race to another, are precisely those under which the epidemic of 1495 developed itself. "Thus everything leads us to believe that the epidemic disease of that period did not differ, either as to its cause or its nature, from certain cases of syphilis in our own day, occurring, for the most part, under special conditions."

WHAT IS SYPHILIS ?

It is not so difficult, perhaps, to answer the question, What is syphilis? as its converse, What is not syphilis? Has soft chancre any relationship to the disease? Is gonorrhœa quite another affair altogether? These are questions which to some appear easily enough answered: but these persons are generally found among those who have read more than they have seen patients, or interrogated nature. In 1542, Vigo divided the French disease into two periods, under the headings "*morbis non confirmatus*," and "*morbis confirmatus*." Thierry de Héry divided the drama of syphilis into three acts: the ulcer, the eruption, and the period of exostosis and caries of the bones; and Ricord, in 1856, in his "*Lettres sur la Syphilis*," has a somewhat similar nomenclature. Bazin, the distinguished French writer on skin diseases, adds a fourth act to the drama: the quaternary period, when the internal organs are affected. Virchow speaks of two periods in syphilitic symptoms: the period of marasmus and cachexia, with degeneration of the viscera, and the period of inflammation and neoplasms. The author is inclined to leave out these stages, and merely treat of the disease as one long act,

co-extensive in some cases, if not in most (as proved by the rarity of fresh attacks), with the life-time of the patient. There can be now no doubt that syphilis resembles small-pox, measles, and scarlet fever, in so many respects as to make it perfectly allowable for us to classify the disease among virulent, special, or "zymotic" diseases. No harm can now be done by such a classification; and, if we mistake not, much light will be thrown on the various facts in the evolution of the disease by considering it as a poison which has sequelæ, just like measles, scarlatina, or glanders. First of all there is a variability in the time of incubation in all virulent diseases. In scarlatina, the period is from a few days up to three weeks, and even more. Typhus fever is said to incubate from three days up to forty days; and hydrophobia has an incubation period of from a few days up to several months. According to Dr. Marsh, in the Dublin Hospital Reports of 1827, inoculated variola had an incubation of from four to eighteen days; and, even in vaccination, cases are mentioned where the pustule has only commenced to show itself the seventh, nay, as late as the twentieth day. In 1863 the author of this paper published, in the "Medical Times and Gazette," the case of a gentleman who wounded his finger whilst sewing up the abdomen of a woman who had perished from tubercular peritonitis. *Thirty* days after this, abscesses appeared in the palm, and he was in a most critical condition for some time.

INCUBATION OF SYPHILIS.

Clinical facts are not of much use in the decision of this obscure point in syphilis; but in several cases, where the author of this paper has seen contamination effected by means of the lips in kissing, there has been a well marked lull between the hour of inoculation and the appearance of the indurated sore on the lip. In one case, where a young woman could mention the very evening when her intended husband had bitten her lip, there was nothing seen for at least fourteen days after the occurrence; and then an extremely hard sore gradually arose, with hard submental and submaxillary glands, followed by multiple eruptions and exostoses. Another lady remembered that it was nearly a month after her intended husband kissed her before starting on a journey, that she observed a sore, which was afterwards recognised to be syphilitic, and the scar of which remains to this

day. But these cases are truly exceptional, and in the vast majority of instances we are left in the most profound doubt, in our clinical examination of patients affected with indurated sores, as to when and where they contracted the contagion. The author is convinced that by far the greatest number of cases of syphilitic infection in males are derived from the discharges of mucous tubercles in the female, not from chancres at all ; and, therefore, he is perfectly able to believe, what experience shows, namely, that the incubation of syphilis frequently extends to more than three or four weeks, nay, even to several months. For instance, Dr. Galligo of Florence inoculated himself from labial mucous plates, and sixteen days passed without anything being seen ; on the seventeenth day two pustules appeared, gradually taking on the appearance of indurated sores. And in the ten inoculations made by the anonymous writer of the *Palatinate*, with the blood of syphilitic patients, and with the secretion from secondary symptoms, the duration of the incubation period varied between fifteen and forty-two days. A great writer (the late lamented Dr. Auzias Turenne) inoculated, in two cases, on healthy persons, the pus of secondary symptoms, and the time which elapsed before any local symptoms appeared was eighteen and twenty-five days respectively. On the 17th July, 1850, Dr. Waller of Prague inoculated, by scarifications, the blood of a syphilitic woman on a healthy boy, aged fifteen. There was no inflammation, and the wounds closed in a few days. On the 31st August, that is forty-five days after inoculation, two distinct tubercles were noticed, the size of a pea, of a pale red tinge. These tubercles became hard and ulcerated, and were followed by secondary eruptions.

In this epoch of syphilis it is clear that individual constitution plays a great part in modifying the progress of the virus. Just as in scarlatina, in measles, and in other virulent diseases, the time of incubation seems to vary much with the constitution of the individual. M. Diday of Lyons has asserted that the incubation which takes place after inoculation with pus from a chancre, is much shorter than that arising after the secretion of secondary symptoms has been inoculated ; but M. Rollet has invalidated this assertion by his observations made in the "*Gazette Medicale de Lyons*, 1859 and 1856." It seems, indeed, that in many cases, such as one published by M. Cullerier, in M. Langlebert's "*Traité des Maladies Veneriennes*, 1864," the incubation after inoculation from a chancre may be as long as thirty-nine days.

Whatever relationship exists between syphilis and the soft or so-called simple chancre, in the immense majority of cases, when this latter is inoculated, there is no incubation period. In about four out of five cases remarked clinically by Dr. A. Fournier, the simple chancre came within eight days after the infecting contact: but in the case of more than one hundred inoculations made by M. Ricord, from such simple chancres, the effect was seen in two days in the form of a small pustule. The author has been able to verify this fact also during the time spent by him in observing the experiments on syphilisation made in London by Dr. William Boeck of Christiania. Rarely, indeed, has any one observed, in the case of simple chancre when inoculated, a complete absence of local symptoms for any length of time.

John Hunter, in his work on "The Chancre," relates the history of an officer who, after two months had elapsed since contact with a dangerous woman, had an indurated sore. But some authors are quite opposed to the incubation of the syphilitic chancre. In a work entitled "*Nouvelle Traité des Maladies Vénériennes*, Paris, 1861," Dr. Melchior Robert says that when we insert on a healthy person the virus of an infecting chancre, the inoculation follows the same course as it does when pus from a soft chancre is implanted. "In no case," he says, "have I noted the phenomenon of incubation spoken of by authors; but always a papule the very first or second day, with a pustule the third, fourth, or consecutive days, and then ulceration; all this has taken place just as in the simple chancre, and when, in order to compare, I have inoculated in the same individual the pus of simple chancre and of infecting chancre, I noticed no appreciable difference in the commencement of the two accidents." Is this not an error in observation of M. Robert's? The author is fain to think so, although he has no desire to experiment, as this deceased gentleman did, with the pus of hard sores on healthy persons. On the whole, one is disposed to say that as far as the evidence before us will carry us, doctors of this time have a right to assume that, whatever the simple chancre may be (and the author does believe that it has a near relationship to syphilis) that sore has, in the immense majority of cases, when inoculated on a healthy person, little or no true incubation; whereas in the case of the hard sore or initial lesion of syphilis, there is always some incubation, at least more than a day or two in duration, sometimes weeks long, and even in some cases months.

This division between the incubation period of the two chancres

has given rise to what is called the "dualistic" school of writers on syphilis. Votaries of this school assert roundly that gonorrhœa and simple chancre have nothing whatever to do with secondary eruptions, and never cause either tertiary or secondary lesions. The author is by no means so certain of this fact as he could wish to be. In the course of clinical hospital experiences, so many cases of tertiary lesions of the bones and throat have come before him, where the patients could give no history of hard sore, or indeed in some cases of anything but gonorrhœa or leucorrhœa, that he considers the dualists can hardly be said to have proved anything more (and that is most valuable) than that soft chancres very rarely are followed by sequelæ, and that gonorrhœa is almost invariably, in the *male* sex, merely local in its effects, and, when inoculated, produces no lesion. In the female sex the case is different, since Mr. John Morgan's, of Dublin, late experiments detailed in the "Medical Press and Circular of 1870," have demonstrated that gonorrhœa, in a woman who is also syphilitic, may produce, when inoculated on any syphilitic person, a soft chancre; and probably, the author should think, a syphilitic chancre in many cases on a healthy person. Professor William Boeck has long contended that the poison of syphilis may produce either a soft chancre or a hard one, according to the degree of acuteness of the inflammation caused by the inoculation; and, also, according to the soil, syphilitic or not, in which the virus is planted. Syphilitic persons do not have a second hard sore; and his experiments, made by means of the pus from hard sores irritated by savine ointment, at the London Lock Hospital, were witnessed by the author in company with many others. Boeck found over and over again that pus from indurated sores, when inoculated on persons with syphilis, often caused the appearance of soft chancres, which would go on for a series of generations, if re-inoculated on the patient. Mr. Morgan's experiments are but a confirmation of Dr. Boeck's reiterated assertions. Now it is evident that a syphilitic person, on whom a soft chancre has been inoculated either by the lancet or by the ordinary method, seen clinically, would be likely enough to infect any person with syphilis, by means of the pus of the soft chancre he might contract. Thus it appears to the author, that a syphilitic person in such a condition might communicate both a soft chancre and also a true chancre followed by syphilis. Hence the doctrines of the dualists require a modification, which they will doubtless receive in a few years at the hands of some gentleman of the powers of

Mr. Henry Lee or Dr. Alfred Fournier. Mr. James Lane and Mr. Gascoyen in London object to dualistic doctrines. At the present moment, all that we are entitled to say is that the initial lesion of syphilis is rarely indeed soft chancre, and still more rarely gonorrhœa; but that *in the immense majority of cases* it is a sore which has appeared with some interval of time after infection.

A most interesting and instructive debate on this subject is, at the moment these lines are being written, going on in Dublin in the far-famed Surgical Society of Ireland, and Mr. Bumpstead of New York seems to be leaving the dualistic school and returning to the views of Hunter. As a general rule it is very easy in the male sex to distinguish a soft chancre from a hard one, *i.e.* from the initial lesion of syphilis. All who are familiar with the outpatient department of male Lock Hospitals, are aware that it is only occasionally that there is much doubt as to whether a sore on the male organ is syphilitic or not. In 1514, Vigo wrote in his work called "*Aphrodisiacus*," page 450:—"Nam ejus origo semper fere fuit cum pustulis parvis interdum lividi coloris, aliquando nigri, nonnunquam subalbi cum callositate eas circumdante;" and Fallopius in 1555 says, "Quoties videtis sanatam cariem et quod remanent calli circa cicatricem, tenete esse confirmatum Gallicum." Ricord stated that gonorrhœa was not followed by secondary symptoms, but held that chancres infected or not, according to the idiosyncrasy of the patients. Bassereau of Paris asserted that the indurated chancre or syphilitic lesion transmits only a chancre of the same kind. "The seed, not the ground, is the cause of the appearance of simple or hard sores." As a general rule, when syphilis is inoculated on a healthy person, the first thing that appears is a papule, projecting a little from the surface of the skin or mucous membrane, and which continues dry, becomes eroded, or ulcerates extensively. In cases where it continues dry, a small patch appears of a dark or brownish-red colour, sometimes covered by whitish scales. In the case where erosion exists, there is at first usually a copper-red spot, which desquamates, and is slightly ulcerated on its surface. This ulceration discharges but a small quantity of serous fluid, and has a diffused parchment-like base. It lasts rarely more than two months. The form most rarely seen, but the best marked of all, is the indurated chancre. It is said that first of all, in cases of this form, there is an induration which speedily passes into an ulcer. In some inoculations, the papule at first formed became covered with greyish scales, which ended in

forming a crust, under which a cup-shaped ulcer was found. The hard chancre presents raised and rounded edges, a glossy iridescent and ecchymosed surface, and greyish floor. Ecchymosis, as Dr. Mauriac, of the Hospital du Midi, has often pointed out to the author, is very frequently seen in the floor of this ulcer. It is surrounded by a hard envelope, which gives a sensation of induration to the touch. In about six weeks cicatrisation takes place. The scar which remains is but slightly depressed, as is common in syphilis of the skin. Induration sometimes persists for the patient's life. Of four hundred and seventy-one infecting chancres remarked by A. Fournier, only twenty-six were extra-genital, and nearly half of these were on the lips. There were three on the tongue, and six at the anus. Syphilitic chancres on women are rare in the vagina, but not quite so rare on the os uteri. The author has usually seen them on the external surface of the larger labia, or at the clitoris. Gangrene and phagedæna are rare indeed in the history of syphilitic sores, although both of these have been seen several times by the author. When such ulcers become phagedænic, ecchymosis is commonly observed on the surface, and the ulcer spreads superficially. When mercury was more used than it is now, phagedæna in such chancres was far more frequently witnessed than it is at present. Thanks to the labours of Hermann of Vienna, and others, the false induction as to the utility of mercury in hard chancres, or, indeed, in any disease, is fast becoming disbelieved in by us all. As to the fact that gonorrhœa is totally alien to syphilis, we have already stated that this holds true only in males, and, even in these, the case is not yet judged. For instance, a man recently in the Metropolitan Free Hospital, suffering from multiple exostosis of the tibiæ and bones of the forearms, had no recollection of any kind of lesion intervening since the time when, about thirty years before, he had suffered from gonorrhœa. This is but one of many similar histories collected and noted by the author, and which abound in works upon syphilis. With respect to soft chancre, so persuaded are some authors that it is not even a poor relation of syphilis, that they call this lesion pseudo-syphilis. In 1838, Ricord distinguished soft from hard chancre, and said that it was curious that soft chancres were not seen on the head. This latter fact has been explained by the fact that soft chancres run through their course very rapidly when inoculated on the head. Dr. William Boeck has tried the experiment of inoculating at the mastoid process of the temporal bone, and found this to be the case.

Fortunately, soft chancres which so rarely cause syphilis are much more common than the other kind of sore. Puchot found them to happen as four to one. The ulcer in soft chancre implicates the skin in its whole thickness. The edges of the ulcer are clearly punched out, as if with a punch; and we usually find two or more such sores on the same individual. Cicatrisation takes place commonly before a month has elapsed. A white cicatrix remains without any induration. There is often considerable pain felt by patients suffering from this variety of syphilis, and the author must assert his conviction that this will be always one barrier towards the adoption of the practice of syphilisation for the cure of syphilis, as recommended by Dr. William Boeck, in which hundreds of such pustules are sometimes artificially produced on the trunk and upper extremities. Besides which, iodide of potassium is much more efficacious. The phagedæna, which not so very unfrequently accompanies this form of chancre, is often very formidable, and has occasionally been known to destroy life, remaining unchecked even by actual cautery and the strongest caustics known in medicine. Boeck, Hjort, and Bidentkap of Christiania, and Köbner of Erlangen, writing in 1864, all assert that this form of chancre is producible by irritating the surface of the syphilitic sore, and the author believes that they have proved their point, although Mr. Henry Lee and others are opponents to this view of the question, alleging that the lesion thus produced is not true soft chancre, but merely inflammatory pus, which, in certain cases, is inoculable, although not syphilitic in character (*Gaz. des Hop.*, 1869). Boeck's and Bidentkap's experiments are so well detailed in the work entitled "*Recherchés sur la Syphilis*," that they have convinced the author of the connection between syphilis and soft chancre being by no means so remote as the dualists would have it.

Thierry de Héry says with regard to buboes, that the most certain sign of syphilis is when, after or during the existence of ulcer of the genitals, we find tumours in the groins, which do not suppurate. Three kinds of swellings of glands in the groin are observed: the simple or sympathetic, the virulent, and the indurated. In the case of sympathetic buboes, there is not much to be said, seeing that this form differs little from the glandular swellings remarked in ordinary irritations; but in about one quarter of the cases of soft chancre, virulent monoglandular buboes are perceived, which almost always suppurate, and which furnish inoculable pus. Phagedæna not unfrequently occurs in these forms of

buboes, and the ravages committed by it may be most extensive and often very difficult to arrest. Mr. Hutchinson uses hot baths. Notwithstanding all that has been written by the French authors, and by their followers in this country and abroad, there can be little doubt that cases do occur, in which it is very difficult to give a certain prognosis as to whether syphilis will follow after an ulcer or not. We may say, in general, that, when a slight superficial ulcer with a serous discharge has persisted for a long time, and when there is multiple glandular enlargement, syphilis probably exists. If the swelling of the glands is wanting we may hope that no syphilis is present. The author of this paper has been by no means able to verify the assertion made by M. Bassereau, that slight chancres are likely to be followed by benignant syphilis. In many cases of extremely indurated sores, he has seen the disease very mild in its course; whilst, on the contrary, benignant sores have been not unfrequently the prelude to life-long attacks of gravity. Phagedænic chancre, however, is undoubtedly often the prelude of severe subsequent lesions, such as rupia. The so-called *secondary* group of symptoms comprehend some eruptions on the skin and mucous membranes, with iritis, falling of the hair, and deep-seated affections of the eye and periosteum. Some six weeks or two months after the syphilitic sore appears, we see some of the forms of eruption on the body, few or almost none of which leave any scars. First of all, in many persons poisoned with syphilis, we see a great amount of chlorosis, and observe a feverish reaction, accompanied by pains in the head, and by rheumatic pains in different parts of the body. This is in many cases accompanied by falling of the hair. The *café au lait* colour is often observable on the face as one of the earliest symptoms of syphilis. The temperature of the body falls notably in many cases of syphilis, and this takes place especially in women. This was first pointed out to the author by Dr. Alfred Fournier, some two years ago, in the case of some patients in the Lourcine Hospital of Paris, and since that date he has frequently verified the fact himself in London.

The forms of skin eruption which are seen in the so-called secondary period of syphilis are very various in their characters, and the period of secondary accidents may last for years. For instance, the author knows of a case where a man had an eruption on his scrotum six years after an indurated sore on his penis; and, having married, he communicated the disease to his wife (although not pregnant), who became affected with roseola and other well-

marked syphilitic symptoms. Roseola or erythematous syphilis is at first one of the most common forms of skin eruption seen. It consists of spots of dark rose colour, disappearing on pressure, and scarcely raised above the surface. This eruption is seen on the trunk and inner aspect of the forearms for the most part, and some say that palmar psoriasis is only a variety of roseola. This eruption may relapse for several months. It is distinguished from measles by the want of fever, but is not always so easily distinguished from the mottling of the skin produced by cold. The papular form of syphilitic eruption is also very commonly met with. The papules present a reddish hue, resembling the rose spots of typhoid fever, and are frequently seen on the forehead in the eruption called *corona veneris*. This form tends to remain long without disappearing, and in some cases it is very difficult to distinguish it from simple lichen, even although lichen is itchy. The pustular form of syphilitic eruption is frequent on the scalp, with alopecia of the scalp, and is also seen on the face and the trunk. Bazin describes three varieties of it—lenticulo-pustular, miliary or impetiginous, and ecthymatous, the last of which leaves scars. The pustular variety is characterised by large pustules, surrounded by a red circle and leaving a white cicatrix, after brownish or blackish crusts. In some cases of pustular syphilis, we may easily be in doubt as to whether we are in the presence of *grosse verole* or small-pox, especially where, as at present, (April, 1871,) we are passing through an epidemic of variola. Vesicular eruptions are rarely seen in syphilis. In one or two cases of it which the author has seen, the diagnosis has been difficult indeed. Squamous affections, or syphilitic psoriasis, are common enough, and are not unfrequently mistaken, as the author has witnessed more than once, for *lepra vulgaris*, or *vice versâ*, by London practitioners. The admirable writer on diseases of the skin, M. Hardy of Paris, observes that syphilitic psoriasis is found in the form of drops of copper colour, covered with fine white scales, on the trunk or upper extremities; also in the circinated form, commonly on the face, or on the palms of the hands, or soles of the feet; in which latter case it is made up of rounded spots of copper colour, covered with hard scales, which sometimes form cracks and fissures complained of by the patients. To distinguish this from ordinary psoriasis is sometimes no easy task; but the itching of the latter, and its seat on the elbows and knees, may often aid us in coming to a just conclusion. The pigmentary syphilitic eruption is one which often

deceives the novice in clinical syphilis. It often comes on, when roseola is disappearing, in the form of rounded, non-prominent spots, with a coffee and milk colour, sometimes covering the whole of the front of the leg or other regions, and being easily mistaken by the unwary for the parasitic affection called chloasma.

Alopecia, according to Fracastor, writing in 1546, was often considered to be caused by the remedies, such as mercury, used for the disease; but it was soon seen that this was one of the natural consequences of the disease, in perhaps five-sixths of the cases of syphilis that come before us. Women suffer more frequently from loss of hair in syphilis than men do. The hair becomes very dry, and, as shown by Mr. Erasmus Wilson, there is a change in its whole structure observable. This alopecia may last for several months, but when the strength returns, the hair becomes generally as strong as before, in this showing the resemblance between syphilis and several of the acute exanthematic fevers. The author considers that alopecia in syphilis is caused by the want of nutrition, which is the effect of the disease, not by the existence of any particular eruption on the scalp, as some would have it. It is remarkable how total sometimes the loss of the hair is, especially in women. In one case observed by the author, the eyebrows came off, along with almost complete baldness of the scalp and fall of the hair from the axillæ and pubes. In the course of two years, however, the lady regained her hair in as great luxuriance as before. The *matrix of the nail* is sometimes attacked by mucous tubercles and syphilitic eruption.

The mucous membranes are, in most cases of syphilis, sure to be attacked by what some persons call generally *mucous tubercles*—a name which has been strongly objected to recently by Fournier and some French writers as unscientific. In the throat we find, in cases of syphilis in its early stages, a uniform redness on the velum palati, tonsils, and pillars of the fauces; often, too, on the posterior wall of the pharynx and the interior of the larynx, but not proceeding lower than this level in the gullet at any rate. The mucous membrane of the nostrils sometimes also, but rarely, is reddened as if there were ordinary coryza. This erythema has been often seen by the laryngoscope in the larynx, in company with whitish raised patches. In such cases the voice is hoarse, but the affection is not of long duration and is easily cured. The author does not remember to have made the diagnosis of any case of syphilitic bronchitis in the eruptive period of syphilis, as has been done by Stokes and Graves

of Dublin. But bronchitis is so common an affection, that it is difficult to decide that it is specific, even where the patient is affected with syphilitic roseola, which assertion the author hopes will not be taken to indicate his disbelief in the existence of syphilitic phthisis. On the contrary, he has had frequent opportunity to convince himself of the reality of such an occurrence. Small ulcerations are commonly met with on the surface of the tongue, on the fauces, on the nostrils and sides of the lips, and on the internal aspect of the lips. They are very superficial, but return again and again for years with annoying persistence. There are also certain appearances which are only seen in syphilis. These are characterised by elevated patches of the skin or mucous membrane, circumscribed and more or less whitish in colour, or rose-white. These are developed sometimes on healthy surfaces, or are said to take the place of chancres in the female sex. On the skin, these *patches* are covered with a transparent crust, and surrounded by a swelling. On the mucous membrane the patches are little prominent. The vulva, the anus, the upper part of the thighs, the tonsils, mouth, lips, and spaces between the fingers and toes, the nipples, groins, and ears are most frequently affected. On the scrotum the merest patches are often met with. In the mouth they are at first of a violet hue, and then fissures of the tongue often ensue. They are whitish on the velum palati, and are found on the true and false vocal cords in perhaps one in eight cases of hoarseness occurring at this period of syphilis. Such appearances are seen at the edges of the nostrils and mouth for years. The author cannot share the optimism of Bassereau, who considers such appearances as evidence that syphilis is likely not to be grave in after years. Some of the worst cases of tertiary syphilis he has seen have occurred when patches of this kind have been common. As to vegetations, or warts, these are no proof of the existence of syphilis, as they occur in persons who have never suffered either from gonorrhoea or syphilis. All such ulcers and patches, on whatever part of the body they are situated, are full of contagious secretions, and as they relapse for many years, it is difficult to say when a person affected with syphilis leaves off being a focus of contagion. In syphilitic women with leucorrhoea the contagion may seemingly last a quite indefinite period. Probably, however, in the course of some six or seven years contagion rarely exists, or, indeed, in most cases is over in three years.

The glands which swell at this period of syphilis are the inguinal, posterior cervical, the mastoid, submaxillary, axillary, and popliteal.

There is usually, although not always, some local lesion in the vicinity, which accounts for this swelling. In children, and even in adults, these swellings remain permanent for years. Does jaundice ever arise from syphilis? The author believes that it occasionally does. In children the joints are sometimes much swollen in this period of the disease, and although this is rarer in adults, cases of the kind do occur. The superficial bones, such as the tibia and the ulna, not unfrequently suffer from periostitis, which causes great pain, especially at night-time, and the testicles are apt to become inflamed, just as they are in gonorrhœa, in some rare cases, at this period. The author has seen in several cases hemiplegic seizures arise in the midst of the eruptive period of syphilis. A well-marked case of this kind came under his notice in 1869 at the Metropolitan Free Hospital. A man, suffering from corona veneris and papular eruption over the trunk and upper extremities, was brought into the hospital speechless and with hemiplegia of the right side. He has continued hemiplegic and nearly aphasic up to the present time, 1870. In the post-mortem observation on a similar case, related by Dr. Kuh, infiltration of the convexity of the brain with yellow exudation was found, and a similar diagnosis was made in this case.

Syphilitic iritis is one of the most frequent forms of syphilitic affection observed in the eruptive period of the disease. In a prolonged attendance on the Royal Moorfields Ophthalmic Hospital, the author has had ample opportunity to study this disease. Some writers say that there are two varieties of syphilitic iritis—superficial and deep-seated. When syphilitic iritis is of its ordinary type, the eye is red from congestion, the iris dull, then of a dusky hue, with occasionally small elevations on its surface. The pupil is uneven, and more or less altered in form—triangular, or shaped like a shamrock; the iris sometimes assumes a yellowish rusty hue. In some cases there is adhesion of the posterior part of the iris to the lens. Such iritis is apt to recur year after year, and often, in this way, to cause irremediable damage to vision. The pain is slight at first; afterwards, it is severe around the orbit. Intolerance of light is uncommon. It is rare that both eyes are attacked at once, but not rare to see one affected after the other. It lasts a long time; and although, when carefully treated by iodides and locally by atropine, (gr. iv. ad 3j.,) the result is often good, it must be said that the prognosis of syphilitic iritis is far from being usually a good one. This form of iritis has not uncommonly

been met with by the author in syphilitic children, and has been recognised by the irregularity of the pupil and the presence of dimness of the cornea and of tubercles on the iris. In not a few cases the inflammation of syphilitic iritis extends to the choroid and retina, and causes destruction of the eye. Besides which, syphilitic *corneitis* is sometimes seen to follow or precede this affection, and this complication of syphilitic iritis frequently causes permanent imperfection of vision. Since the use of the ophthalmoscope has become generalised, the existence of choroiditis of syphilitic origin has been ascertained. The patient complains of muscæ and dimness of vision, and the ophthalmoscope reveals long sinuous veins, with hazy vitreous, showing the optic nerve as if in a fog. There are patches of exudation seen on the choroid. The prognosis, if iodide of potassium is used, is not very bad. In syphilitic *retinitis* the optic nerve has an ill-defined outline, and is surrounded by a dirty-greenish zone. There is photophobia. By means of the ophthalmoscope the vessels of the retina are found injected, and the veins are much dilated in some cases, and obliterated in others. Another form of affection, somewhat rare, in the syphilitic eruptive period is mydriasis. The author has only observed some three or four examples of this. Mr. De Méric has published a small pamphlet on the subject, and it is well that all physicians should be aware that syphilis is sometimes a cause of this affection, as it is by no means incurable in such cases, if Calabar bean be used and iodide of potassium freely administered.

Lancereaux and some others place rupia among the affections peculiar to the period of gummy products. The author is of opinion that rupia should rather be placed among the eruptions of the early period of syphilis. In several cases he has seen rupia of a formidable character (and in one private case, seen in company with Mr. Robert W. Dunn, a few years ago, acute rupia proved fatal) occur within a year of infection. Impetigo, ecthyma, and rupia are the three forms of the rupial division of syphilitic eruptions, and form what is called *malignant syphilis*. In all of the three a red spot is first seen, on which pustules arise. These burst, and a greenish crust forms over an irregular ulcer, with small-sized granulations, and surrounded by a red circle. Rupia is *most* frequent on the lower extremities, but may extend over the whole body. There is usually a profound state of cachexia in such cases, and the author has remarked that several cases of visceral syphilis which have proved fatal have been preceded by eruptions of rupia. Fortunately,

malignant syphilis is comparatively rare at the present day. We occasionally witness in the eruptive period small tumours of a dusky red colour, which occupy the whole thickness of the skin, and which soften and give rise to phagedænic ulcers. In addition to these, we have the tuberculo-ulcerative cases, which are seen chiefly on the face, especially on the nose and lips, and which are characterised by hard, bright red pimples of coppery colour, and which are serpiginous. When these heal, they leave ugly and indelible scars. The most formidable of all these affections is the tuberculo-ulcerative affection, described first by Rayer, which is said by him to commence with a crop of red, hard, smooth, indolent tubercles, which soften after a time and ulcerate, the ulcer being covered by a thick uneven crust, blackish-green in colour. The ulcer tends to extend in surface rather than in depth, and leaves dead white scars, with bridges and depressions. In some cases the ulcer extends deeply, and destroys the nose and adjacent parts very rapidly. There is some difficulty in distinguishing cases like the latter from epithelioma or struma, but the scars of struma are rosy blue, and in cancer the ulceration has round granulations and whitish edges, and the floor of cancerous ulcers is often sanious, and never covered with crusts. The author has over and over again seen such cases taken for struma by persons of experience, but become rapidly cured when large doses of iodide of potassium were administered to clear up the diagnosis—*i.e.*, a scruple thrice a day. With regard to *onyxis*, this affection of the toe-nail is found both in the eruptive period and later on in syphilis. It is also found in the nails of the fingers. An ulcer commences at some part of the lunula or root of the nail, and the toe becomes swollen and of a deep brick red. The nail often falls, and, when the case is neglected, the phalanx may be found to have become carious or necrosed, and to require removal. If constitutional treatment be adopted, however, the result is indeed uncommon. Iodide of potassium, not mercury, should be used in such cases freely. It is impossible to say when the period of *gummy tumours* arises in syphilitic infection. The author has witnessed enlargements of the testes within a year after the virus was absorbed, and has also seen fresh nodes occur at least twenty years after the onset of the disease. To make distinct periods in syphilis, therefore, is apt to confuse the student. It is better to be always prepared for almost any symptom in a person who has absorbed the poison, and, above all, not be too certain in our prognosis. As is now well known, in many persons

the whole of the disease consists in a few eruptions, and then all is over. The patient's health seems quite as good after as before the insertion of the virus. A certain per-centage of cases of syphilis (shall we say, about seven?) are destined, however, to be severe and life-long in duration, and in them we have to look for the constantly recurring phenomena of gummy tumours. The name of "gumma," or gummy tumour, is as yet hardly known in the English literature of the disease. It seems to be due to Gabriel Fallopius, who, in 1564, says that, "after the pains, or simultaneously, tumours arise near the joints, in the middle of the fibula, or the ulnæ, or on the head. These tumours, when they contain a thick material, like mucilage, are called on this account *gummata* by physicians." Virchow, in his treatise on Constitutional Syphilis, gives a clear account of the nature of these tumours. They arise in the subcutaneous cellular tissue, are from the size of a pea to that of an egg, greyish or yellowish in tint, and sometimes soft or glue-like, but more generally firm in texture. Looked at under a good microscope, these tumours are often seen to be collections of small rounded corpuscles, with some elongated cells. Like tubercles, these tumours rapidly break down, and are painless. The skin becomes implicated and perforated, and an ulcer is left, which on healing leaves the superficial or deep scar of syphilitic appearance. The upper and lower extremities are most frequently attacked, then the head, and the chest and clavicles are sometimes invaded. Constant errors in diagnosis are made by inexperienced persons in such cases, since these *gummata* much resemble boils in some cases, or strumous ulcers, &c. It is important to make the diagnosis early, as the iodide of potassium is almost a certain cure in most of such cases, and, if not given, the damage caused may be frightful and irreparable.

Such tumours may occur in the glands, and occasionally, though rarely, occupy the mammary gland, giving rise to the idea of cancer in the organ. In cases of obscure ulceration of the breast, the history should be well inquired into on this account, and iodide of potassium tried, if there is the slightest doubt, before proceeding to operate. The author was consulted in one case in which this caution proved most useful.

As to the diseases of bone occurring in syphilis, the most marked of all is that of *dry caries*, the worm-eaten bone of our museums, but it is comparatively rarely met with in this disease. Periostitis or osteo-periostitis is the most

common, and gummy tumour of bone is much less frequently met with. In periostitis, the inflammation usually commences in the periosteum, and sometimes in the substance of the bone, and the Haversian canals are found dilated. The bone becomes denser; then nodes form on the periosteum, which sometimes disappear, but often suppurate and the bone becomes carious. Such phenomena are often witnessed on the tibia, the fibula, the ulna, the clavicle, or any of the superficial bones, and especially on the cranium. Fortunately, since the days of iodide of potassium, such lesions are generally rapidly cured; before that time, however, when that dangerous drug, mercury, was used, bone disease was often quite incurable. The gummy tumours of bone are not nearly so frequent. They are, in rare cases, found in the substance of the bone, but more generally in the periosteum, and, when opened, a glue-like fluid exudes. In fortunately exceptional cases, they may occupy the diploe of the skull, and cause necrosis of the part. This occurred extensively in the case of a gentleman who consulted the author some years ago, and who had been in the habit of reading all that was published on syphilis, and swallowing, *propria motu*, a large quantity of quicksilver in a fluid state for years. In many cases of syphilis of old standing, on putting the finger on the cranium, various points are easily perceived where the bone has disappeared from the softening of one of these gummata.

Dr. Wilks, Dr. Jenner, and others have called particular attention to the occurrence of dry caries of the skull in syphilis. It is remarkable how few symptoms may be exhibited, even in cases where this kind of caries has caused the exterior table of the skull to present the appearance of a sieve. The author, in more than one instance, has seen this appearance in patients who during life had complained only of slight though very persistent, headache. Such dry caries seem also to attack the bones of the nostrils in some cases, although periostitis is almost always the cause of the concomitant ozaena. Whilst one part of the bone is wasting away from caries, the neighbouring part is, in many instances, made thicker by deposit in its interstices. The author has not seen any case of softening of the bones (mollities) from syphilis. The pain in syphilitic affections of the bones is frequently nocturnal, and causes sleeplessness in many cases. When in the bones of the head, it may result from a node on the internal aspect of the skull. There is often great giddiness and epileptiform seizures, with a feeling of tearing and horrible twisting of the parts complained of.

Loss of vision is sometimes caused by exostosis of the sphenoid bone. Dry caries of the skull is characterized in most cases by persistent headache, and by slight prominences which leave depressions.

Rheumatic exostoses are sometimes confounded with syphilitic, but are more irregular, multiple, and confined to the joints in most cases. Where treated with iodide of potassium and blisters, the syphilitic forms usually rapidly disappear, and end in resolution. Treated by mercury, they are often gravely and rapidly aggravated, according to the author's and other persons' experience.

The *cartilages* of the larynx are not unfrequently attacked by syphilis, and death is frequently the result of the narrowing of the air passage from the necrosis of some of the cartilages. In the case of an elderly woman recently under the care of the author, after death, which was postponed by tracheotomy, performed by Mr. Charles Smith of Brighton, complete destruction of the epiglottis was found to exist. In other cases, the aphonia is caused by the destruction of the vocal cords, and the necrosis of some of the cartilages, either of the trachea or larynx. The same thing has been observed by the author in cases of hereditary syphilis.

Syphilis very rarely attacks the joints, but the author has seen it do so in more than one case of hereditary syphilis in children. Gummy tumours also sometimes occur in the muscles, and destroy a portion of the muscular tissue, thus causing shortening and deformity of the limb. It is chiefly in the forearm that such deposits in the muscles take place, but they may occur in almost any of the muscles of the body. Lisfranc mentions the occurrence of a large tumour in the tendo Achillis, which got well by the administration of iodide of potassium.

Syphilitic disease of the testicles is frequently witnessed; and is often followed by absence of spermatic filaments in the semen. Sometimes there is interstitial deposit in the testes, which is characterized by tendinous looking bands, radiating from the tunica albuginea, and insinuating themselves between the seminiferous tubes, and thus compressing and separating them. The tubules become atrophied, and the testicle, hard at first, then degenerates and wastes. Almost all cases of chronic orchitis are syphilitic. Sometimes in cases of syphilitic orchitis, we find tumours the size of a walnut, or egg, or small nut, deposited in the midst of the testes. They are almost dry on section, and contained in a whitish capsule. They are often composed entirely of cells and

nuclei. Such, and all forms of syphilitic testicle, are rapidly cured by large doses of iodide of potassium. Mercury is quite out of place in such affections. We often find great difficulty in the diagnosis of tumours of the testicle; and have to guide us chiefly the fact that tuberculosis commences in the epididymis in the great majority of cases. Tubercle rapidly softens and forms abscess; syphilis very rarely does this. Cancer is a product of much vascularity, and not so likely to be taken for syphilis. Unlike the case of gonorrhoeal orchitis, there is rarely any pain at the onset of syphilitic sarcocele, nor is there much tenderness on pressure. We remark a pear-shaped tumour, either smooth on the surface, or with irregularities. There is but little hydrocele in general, and both testes usually become affected. In several cases examined by the author, there has remained a sterile condition as a result of this condition of the testes, and this in some cases but ten months after infection. It is very slow in passing through its stages, and, fortunately, if iodide of potassium be had recourse to in large doses at once, this untoward consequence may in most cases be avoided. Even when cured for a time, we must be on our guard, as syphilitic sarcocele is apt to relapse after a time.

The author is inclined to believe that the analogue of the testis, the ovary, is almost as frequently attacked by syphilis as the former. Of course, this assertion is not easily proved or disproved; but a sufficient number of post-mortem observations have been given to show that syphilitic ovaritis is by no means unfrequently the cause of sterility in prostitutes. Syphilitic disease of the neck of the uterus produces those never-ending discharges which are so common in women who have once been infected with syphilitic poison.

All physicians who have paid attention to the subject of syphilis of late years are well aware that albuminuria of a fatal character is by no means rarely the effect of the poison of syphilis. Rayer, in his justly celebrated work entitled "*Traité des Maladies des Reins*," remarked that syphilis was a common cause of disease of those organs. One observer, Dr. Engel, has calculated that about one in three cases of chronic Bright's disease is due to syphilis. This is probably an exaggeration; but the author has seen many cases in which the cause of the disease was but too clearly the syphilitic virus. The post-mortem appearance of the kidneys in syphilitic albuminuria is a smooth surface, with yellow points mottling the surface. Sometimes the surface presents knobs or

rugosities, as in ordinary chronic nephritis. The epithelium is in a fatty condition. Altogether, this is one of the forms of chronic interstitial nephritis, resembling to a certain extent the gin-drinker's kidney, &c. In some cases we find gummata in the cortical part in the form of small tumours, of the dimensions of a pea, and yellowish white, which the microscope shows to consist of cellular elements.

In some cases, cicatrices in the kidneys are found, indication of the former existence of such gummata. In the case of a man who died recently under the observation of the author, at the Metropolitan Free Hospital of London, there were rupial sores over the whole body, accompanied by cachexia, for which the patient was treated by mercury for some time at Guy's Hospital. When first seen by the author, there was œdema of the ankles, as also large quantities of albumen in the urine, which showed in the microscope fatty degeneration of the renal epithelium, and some casts of the tubes. After death, interstitial nephritis was found, and a tumour the size of a small nut in the cortical part of the right kidney. The course of syphilitic Bright's disease is slow, and most commonly fatal, although in one or two cases the author has found a cure take place from the use of iodide of potassium for a long period. For instance, in a case of enlargement of the liver in a syphilitic patient, there was albuminuria for a short time, which disappeared as the liver gradually became smaller under large doses of that invaluable specific. In another case, a woman, mother of a syphilitic child, had albuminuria and anasarca on two or three different occasions, in the course of some five or six years that she was under the author's observation; but at length appeared to become entirely free from albumen in the urine.

The most common, probably, of all the late symptoms of syphilis is deep ulceration of the mouth and pharynx. Such ulcers attack the tonsils and pharynx, and rapidly destroy them in many instances, especially in women, who are so careless about their health. The whole of the tissues become reduced to a mass of pulpy consistence, adhering to the floor of an unhealthy ulceration. The bones of the hard palate often become exposed by such ulceration and necrosed. The palate is commonly attacked, but the pharynx and larynx very frequently are involved in the mischief, which may be sometimes truly deplorable. The author has seen one case of paralysis of the upper extremity, caused by the extension of the inflammation to the envelopes of the spinal cord in the cervical

region. Iodide of potassium is such an admirable remedy in such cases, that such untoward terminations of syphilitic pharyngitis but comparatively rarely occur in London at present; although sloughing of the throat is extremely common among the out-patients of the different large and especially the free hospitals. Tumours are found in the tongue in many cases, near the base especially, like hazel nuts. If not treated, these soften, and, bursting, leave abscesses on the organ and cicatrices. They are not unfrequently mistaken for cancer when in the ulcerative stage, but the chronic progress of the syphilitic ulceration and the want of implication of the glands show the diagnosis. Gummy tumours often form in, and rapidly perforate the velum and the hard palate. They should be at once vigorously attacked by large doses of iodide of potassium, and cauterised with strong nitric acid, to save damage being done. The same treatment should be fearlessly applied to the ulcerations which often fill the pharynx with a mass of putrid detritus, preventing deglutition and destroying appetite. It is amazing how large the cicatrices in the pharynx sometimes are, and how the ulcerative process sometimes ceases spontaneously, never to return. Adhesions of the uvula to the posterior wall of the pharynx are not uncommon, and stricture of the œsophagus opposite the larynx has been met with by the author. Dr. West of Dublin has given some cases of syphilitic strictures of that canal, as also Dr. Morrell Mackenzie, in the *Pathological Society of London Transactions* for 1869. In one case mentioned by Dr. West, the stricture was two and a half inches in breadth at about four inches below the level of the epiglottis. A small sound, No. 4, could hardly be passed. The author has met with a similar case.

Virchow seems to refer some cases of thickening of the stomach to syphilis; and thickening of the stomach in the pyloric region has been referred to the same cause. M. Cullerier is an authority upon this point. Syphilitic ulceration of the large intestine is spoken of as sometimes causing persistent diarrhœa. In several cases of chronic diarrhœa, seen by the author, there has been a syphilitic history, and in more than one there has been affection of the rectum; but whether the diarrhœa was caused by specific ulceration of the colon remained uncertain, in the absence of post-mortem examination. In one case of blood in the fœces, alternating with diarrhœa, iodide of potassium did a great deal of good. There is an affection of the rectum, which is now well known to be syphi-

litic, and which causes stricture and great suffering. Usually about an inch above the anus, we find a hard ring, scarcely admitting the finger, and formed of thickened mucous membrane, with transformed subjacent cellular tissue. Below this stricture, the mucous membrane is turgid, and covered with pus, and above it is eroded. Women are most subject to syphilis of the rectum. This affection is accompanied by obstinate constipation, varied by diarrhoea, and causes wasting and emaciation. Dilatation by bougies and the use of iodide of potassium are both required.

Peritonitis is seen in syphilitic children in many instances, and occasionally in adults, when the liver is the seat of inflammation of a specific character. Simpson and Bærensprung give cases to illustrate this fact. The affections of the *liver* due to syphilis have been explained by Ricord, Rayer, Wilks, Virchow, and Frerichs, and although some physicians seem still to doubt their connection with syphilis, the author thinks that they are well made out. In the liver we find the occurrence of interstitial hepatitis, of gummata, and of cicatrices. There can be no doubt that many cases of supposed alcoholic cirrhosis of the liver are due to syphilitic inflammation of the organ. In such cases, there is found after death a peculiar aspect of the organ. Instead of the granulations seen in alcoholic cirrhosis, we find a deeply furrowed condition of the liver, causing it to look like the "kidney of a young calf." This is due to the formation of new elements in the connective tissue of the organ and to the wasting of the liver cells. The edges of the liver are irregular, and the capsule is generally thickened. There are whitish patches seen in places, and on section bands of white fibrous tissue are seen extending across the organ and causing the appearance of puckering observed at the surface. A more common form of syphilitic disease of the liver, is that called gummy tumour of the liver. The liver in these cases is indurated and attains, sometimes, a very large size. In post-mortem examinations of such cases it has been found that the liver substance is covered with small round grains, distinct from one another. The liver is yellow, hard internally, and, on cutting it, small hard tumours are felt to resist the knife. In a case recently in the Metropolitan Free Hospital, under the care of the author, that of a young man aged twenty-one, a sailor, there was a very great enlargement of the liver, which extended two inches below the umbilicus, and was accompanied by iritis and disease of the maxil-

lary bone. The young man, after two months' treatment with iodide of potassium, left the hospital well enough to resume his business as a sailor, and with the liver much diminished in volume. There was no ascites in this case, nor any feeling of irregularity in the surface of the organ, which felt hard and was quite free from fluctuation.

In some cases, small tubercles, or nodosities, are found in the liver, of a yellowish white colour, dry, and surrounded by a yellowish, callous, or tendinous tissue. These tumours are generally deep-seated, and are sometimes as large as an egg, but are generally the size of a pea or smaller. Sometimes they are found to be softened and partially absorbed. For a long time such tumours were called cancer or tubercle of the liver; but the cancer tumours of the organ are very moist and vascular, the syphilitic not. Syphilitic cicatrices in the liver were noticed by Lancereaux in fourteen out of twenty-two examinations of visceral syphilis. The liver is liable to fatty degeneration in syphilis. Dr. Wilks and others have given cases to show that syphilis leads occasionally to waxy degeneration of the liver; and Graves and Budd attributed the waxy liver to a combination of syphilis and mercury. In some cases of syphilitic liver, a sensation of projection on the surface of the organ is experienced, similar to that felt in cancer. Ascites is found with the cirrlosed variety, and even with the gummy form of liver, but jaundice is rare. Diarrhœa is common, and is serous and sometimes blackish in colour. The urine is frequently albuminous, but, in some instances, the disease produces no symptom save marasmus, which is sometimes wonderfully benefited by large doses of iodide of potassium. The skin is discoloured, and the patient looks cachectic; these two symptoms, with the palpation of the organ, and a history of syphilis, may clear up the diagnosis in most cases. Tubercular peritonitis commences with pain in the abdomen, and with diarrhœa and vomiting; and alcoholic cirrhosis is met with in drunkards, there being the usual sour eructations to guide us. The specific disease is unfortunately but too often fatal, but much less so than other forms of hepatic disease.

The lymphatic glands are extensively affected in some old cases of syphilis. The volume of the thyroid gland is sometimes increased, and the supra-renal capsules have been found enlarged and degenerated in visceral syphilis. The spleen is sometimes affected just like the liver, also with gummata, in the form of rounded nodosities. The glands of the abdomen are most fre-

quently attacked in syphilis; they become indurated and enlarged. The spleen is sometimes felt to be enlarged, in children especially; and doubtless, syphilitic cachexia is due to a certain extent to the disease of this and other blood glands. In one case of bronzing of the skin seen by the author, there was a distinct syphilitic history. Of late several cases of syphilitic pericarditis and even of gummy nodules in the substance of the heart have been mentioned in the London Pathological Society. The diagnosis in such cases seems out of the question. The gummy tumour is found in the muscles of the heart, the valves being usually intact. Such tumours are usually rounded and of the size of a pea, or even larger. Dr. Balfour of Edinburgh, and others, have narrated cases which leave no doubt that aneurism of the aorta and great vessels is frequently caused by syphilis; and Morgagni says that he has frequently seen the aorta ulcerated and corroded in the bodies of those, especially, who have suffered from syphilis. The cerebral arteries have been found obliterated in cases of syphilis, so that this disease causes arteritis in some cases. Dr. Wilks has given cases of aneurism of the aorta which he ascribed to syphilis (Guy's Hospital Reports, 1863).

The syphilitic diseases of the larynx have been long known; but these of the lungs are only being studied after the long period of sluggishness left by the doctrines of Laennec and Louis. The tertiary syphilitic lesions of the larynx are of grave importance. Ulcerations of the epiglottis, tending to perforate it, are found; ulceration of the mucous membrane over the vocal cords is by no means rare, and is of fatal termination in many instances. When such ulcers heal, they may leave behind dangerous narrowing of the chink of the glottis. Gummy tumours develop in the mucous membrane of the epiglottis or vocal cords, soften, and ulcerate. Œdema glottidis is often caused by syphilitic inflammation, and the cartilages may become carious or necrosed. It is said that tubercular ulcers commence generally from below, and proceed upwards towards the larynx; but, in practice, the author has often found it very difficult to make the diagnosis between syphilitic and tubercular laryngitis, although sometimes the case is plain enough. There is aphonia and dyspnoea in most cases. The cough is short, and expectoration may be scanty or absent in some cases; in others it is purulent or tinged with blood. Asphyxia may take place rapidly from œdema glottidis. Deglutition is sometimes very difficult, especially when the epiglottis is attacked. At the North

London Consumption Hospital the author has observed two cases of syphilitic laryngitis suddenly expire from dyspnœa caused by œdema. Laryngotomy was tried in one case, but did not much prolong life. Large doses of iodide of potassium sometimes effect a cure, if given in time. In one case, a soldier who was brought to the hospital in a dying condition, and in whom aphonia existed in company with syphilitic sarcocele and cavity in the right lung, the iodide quite restored the man to health in a few weeks, and he left in two months almost quite well. Pressure on the larynx was painful in this case.

The *trachea* is by no means very rarely affected in syphilis of adults or in hereditary cases. The lower rings are usually the ones affected; but sometimes the lesion occurs near the larynx. Ulcerations and thickening of the submucous tissue occur, and leave narrowing of the trachea, so that even a quill will not pass. A severe case of this kind was in the Metropolitan Free Hospital in 1869, in a young girl aged fifteen, suffering from hereditary syphilis, in whom there was great narrowing of the trachea, and various other syphilitic lesions present. Small nodules have even been remarked on the walls of the bronchi, whilst there has been fibroid disease of the lung observed without any tubercle. The bronchi may be extensively ulcerated, and filled with pus from syphilitic ulceration. Whistling sound heard in inspiration is a clear indication of the lesion of the trachea, and auscultation reveals nothing abnormal in the chest. The use of specifics is indicated in affections of the trachea of syphilitic origin; but under any treatment the worst must be feared, as tracheotomy is usually contra-indicated, the disease being low down in the trachea.

Since the writings of Dr. Andrew Clark and others have drawn renewed attention to the old doctrine as to the compound nature of phthisis pulmonalis, we have begun to remember that the ancient writers asserted the same thing. Baglivi, writing in 1745, says that phthisis is very often a secondary disease after the principal diseases, as, for instance, after syphilis; and, in 1826, Van der Kolk speaks of certain ulcers or collections of pus in the lungs without any tubercle being present. It is now asserted by writers on syphilis, that the disease of the lungs occurs under two forms: firstly, that of interstitial pneumonia occupying the upper, middle, or lower lobes of the lungs; and secondly, where the tissue of the lungs is found hard, elastic, easily broken down, and non-crepitant in places. When such pneumonias are cured, a mass of fibrous tissue

remains. Gummy tumours are found in all parts of the lungs, in the form of greyish or yellowish white tumours, the size of a pea or nut. These soften, and leave cavities, just as tubercles do, but are not unfrequently cured, and leave the cicatrices so frequently observed in the lungs of persons who have died of syphilis. In the case of a female patient who died of what the author believed to be syphilitic phthisis, at the North London Consumption Hospital in 1868, there was a large cavity found in the middle lobe of the right lung, and cicatrices were found in the left lung, the tissue of which was indurated in several points, and non-crepitant. No tubercle was found in any part, but there were several small tumours in the left lung, about the size of a pea, similar to those seen in the liver in syphilis of that organ. In this, as in other instances of syphilis of the lungs, no dulness was observed on percussion, and the stethoscopic sounds were those of cavity in the right lung. The sputum was muco-purulent. In several cases that have come under the author's notice, there has been little to guide the diagnosis, save the occurrence of cicatrices in the pharynx, depressions on the skull, or syphilitic sarcocele; and post-mortem verifications have too often been denied. Such cases are eminently amenable to remedies, and large doses of iodide of potassium should at once be administered—as much as fifteen grains four times a day. Tuberculosis always commences at the apex of the lung, and progresses far more rapidly than syphilis of the lungs, which is one of the forms of chronic phthisis. The author has had no less than two cases of syphilitic phthisis under his care at one time at Hampstead. The one occurred in a soldier, aged about thirty, and the other in a man of about the same age, employed in a large wine store in Oxford Street. In both of these men there were extensive marks of tertiary disease over the body, and the lung symptoms were far advanced and threatened to prove fatal. Both cases left before the end of the cure could be seen. In one case, seen in 1867, two cavities filled with cheesy matter were found in the left lung, the lower lobe of which was indurated and noncrepitant. The upper lobe was healthy, and no tubercle existed anywhere. There cannot then be any doubt that, in many cases of pulmonary consumption, we shall find on careful enquiry, a history of tertiary lesions in other parts of the body; and this should make us more hopeful and eager to try therapeutic agents in the fell disease which carries off one-eighth of the population of the British Islands. For the most part the author has

found tubercular phthisis quite incurable, although occasionally very chronic.

Diseases of the nerves, too, are only now again beginning to be recognised as very frequently caused by the poison of syphilis. On this point, once more, the old writers knew more than many moderns, for Thierry de Héry, writing in 1634, described these syphilitic diseases of the nerves; and Van Swieten, of mercurial renown, says, in 1773, that he has frequently observed vertigo and even epilepsy caused by venereal contagion. In 1803, a physician named Cirillo guessed that epilepsy might be syphilitic. The dura mater is often attacked in syphilis of the brain, and is sometimes found adhering to the other membranes of the brain, when osseous lesions are present, and, perhaps, tumours of gummy nature. In a man aged fifty-two, who died in a fit of epilepsy, there was found, in addition to many marks of tertiary ulceration over the body, a tumour in the anterior portion of the left hemisphere in the dura mater, which it glued to the neighbouring parts.

The convex surface of the hemispheres is often attacked by diffused formations of cheesy consistence, and also the anterior part of the base of the brain. When the dura mater is diseased, hemiplegia may occur, or simply vertigo and headache when the cerebrum is attacked. When the cerebellum is implicated, vomiting may occur. In the case of a man who was brought into the Metropolitan Free Hospital in 1869, under the care of Dr. James Jones, there was right hemiplegia and aphasia, and the author made the diagnosis of diffused syphilitic inflammation of the base of the left hemisphere. There were abundant marks of syphilis in the patient to warrant the diagnosis of specificity. In cases of epilepsy, the dura mater is sometimes found very extensively attached to the pia mater by exudation of specific character. In place of true epileptic seizures, we may have the petit mal of the meninges, caused by syphilis, in the form of momentary loss of consciousness and vertigo, with or without convulsions. Dr. Brown-Séquard used to point out that syphilitic epilepsy was usually accompanied by unilateral convulsions. We find syphilitic epilepsy, as is most natural, in persons after the age of twenty-five; and, in all cases of epilepsy occurring in adults, we should take care to be assured what the history with regard to syphilis has been. Recovery, in the author's experience, is by no means unfrequent in such cases of specific epilepsy, if iodide of potassium and bromide of potassium

are steadily administered for a lengthened period. Some authors will have it that in syphilitic epilepsy there is not the same struggling observed as in the true epilepsy of the young, and that the somnolence after the attack is not so well marked. This may sometimes be true, but is not always so. In a gentleman whose case was long observed by the author, there were all the symptoms which usually accompany ordinary epilepsy, and these persisted for years, until the patient was put under treatment by iodides. After that the fits disappeared for many years, and have not, perhaps, returned at all. He had then healthy children. Syphilis sometimes causes partial softening or induration of the brain, or tumours may be found in the substance of the corpora striata. A case is mentioned by Dr. Hérard, of Paris, where two tumours were found in the right corpus striatum, of pinkish yellow colour. Others are found in the cerebellum or in the commissures near the periphery of the brain. Yellow patches are sometimes found in the ventricles. Apoplectic cysts are easily distinguished from syphilitic tumours of the brain. As remarked by Dr. Hughes Bennett, when the periphery of the brain is attacked, we find loss of memory, sometimes accompanied by loss of speech, and it would seem that insanity, or dementia, are by no means so uncommonly as has been asserted due to syphilis of the brain. Syphilis of the brain may produce any kind of paralysis that is producible by brain lesions. Low spirits are very observable in syphilitic persons with tertiary affections, and are doubtless produced by some such affections. They are common in women who do not speculate on the causes of their sensations. Vertigo, so much complained of by old persons, is oftener than we are aware of due to the presence of syphilitic deposit in the substance of the encephalon. Many cases of syphilitic hemiplegia and paraplegia have come before the notice of the author. Aphasia is frequently caused by syphilis, and diabetes and polyuria have been attributed to this Protean disease. In such cases we might expect to find some lesion in the cerebellum. Syphilis of the brain is much affected by treatment, and iodide of potassium will often be found to cure cases of epilepsy and vertigo which have resisted bromides of potassium or ammonium. This, however, is contested by some writers, who prefer the iodide or bichloride of mercury in syphilis of the brain. The author has such an unconquerable aversion to the use of mercury internally, from old observation of the evil effects of it, in syphilis, and other diseases, that he has never used it in any case of syphilis for many

years. In this opinion he is countenanced by Dr. Bœck and others of the Christiania school.

As to the diagnosis of syphilitic hemiplegia, headache, vertigo, and other symptoms yielding to iodide of potassium may help us, and the hemiplegia seen in this disease comes on with more warning than it does in cases of hæmorrhage or softening of the brain after embolism. Then, the want of the aura and complete loss of consciousness are *said* to be characteristic of syphilis. The palsies connected with syphilis are more hopeful than many other varieties of paralysis, being amenable in some cases to the action of iodide of potassium, but there are too many of them which are incurable even by that potent specific. The most incurable lesions are those found in the base of the brain. Syphilitic affections of the cord usually occur in the dura mater. The cord may be turned into a substance resembling fibrous tendon, and the nerve cells obliterated, or it may be softened in cases of paraplegia from syphilitic myelitis. Cases of gummy tumours of the cord have been met with exactly similar to the nodules found in the liver (Wilks). Locomotor ataxia has been sometimes ascribed to syphilis. The author has met with several clear cases of paraplegic syphilis, and in most cases of paraplegia in adults he is generally in the habit of trying the effect of iodide of potassium. Sometimes the arms are affected, when the lesion is high up in the cord; sensation is often intact. Treatment, if immediately commenced, will be found efficacious in a certain number of cases, provided iodide of potassium be used without stint. It is the most curable of all forms of paraplegia. Galvanism (Stöhrer's continued current) should be used to the limbs. Compression of the nerves, at their point of exit from the cranium, may cause many affections of the cranial nerves. Small gummy tumours may be found in their course, in the coverings of the nerve, or even in the nerve itself. The optic, the fifth, and the third nerves are those most frequently affected. The author has seen numerous cases of palsy of the third pair at the Royal London Ophthalmic Hospital. Such paralyses usually occur far on in the history of syphilis. Ptosis, from syphilitic causes, is very common, and diplopia with strabismus far from uncommon. The sixth nerve is less frequently implicated, but the facial nerve is pretty frequently affected late on in the disease. In such cases the muscles of one side of the face are palsied. Fortunately, the administration of iodide of potassium is usually, though not always, a speedy cure in this last nervous affection. Aphasia syphilitica is not caused, as some

say, by the implication of the hypoglossal, which lesion, indeed, has not been seen to exist in any case of which the author has heard, but the fifth nerve is often affected in syphilis. In such cases we have tic douloureux of a violent description, usually in the infra-orbital branch of the nerve. Sometimes there is difficulty in mastication. Cases of partial paralysis and intercostal neuralgia have been traced by the author to syphilis, and, in particular, sciatica is not unfrequently a symptom of the poison. Thus, in doubtful cases of the latter painful affection, large doses of iodide of potassium should always be tried.

One of the most common and dangerous affections of the later period of syphilis is the rhinitis, which causes ozæna. The author has often seen the origin of this distressing affection misunderstood, to the great detriment of the patient, who might have been rapidly cured by iodides. One nostril is generally first attacked, and the patient complains of obstruction, and sometimes of pain at one point. The external integument may become red and inflamed. Then sero-sanguinous fluid begins to exude, and is often foetid. When the inflammation is confined to the anterior part of the fossa, crusts are seen covering ulcers. But, unless checked, the disease gradually attacks the cartilages and bones of the nose, and may cause the nose to become flat and thin (sheep's nose). Altogether, this is a most serious lesion, and requires vigorous medication, with large doses—such as a scruple—of iodide of potassium, in a wine-glassful of water, thrice a-day, to cure it. Topical remedies are, the author thinks, not of much avail when the disease is deep-seated, but the iodide is in this case a perfectly wonderful specific. The author has not seen it fail in any instance, and can warmly recommend large doses of the salt in ozæna syphilitica. Scrofulous lesions of the nostrils resemble syphilitic in many points; with care, however, the diagnosis may generally be made out. But scrofula is, in some cases, so like hereditary syphilis as to be almost identical, and the author has recently had a case of ozæna in a girl aged fifteen, which completely puzzled him. It was much benefited by iodide of iron. The nasal canal has been long known as liable to become inflamed in syphilis, especially in the later periods. The bone not unfrequently becomes necrosed. The author has not unfrequently met with disease of the canals, with epiphora, in hereditary syphilis. In the case of a young woman of the age of eighteen, recently under his care, with interstitial corneitis, epiphora, and pegged and notched teeth, Mr. Couper, of the Royal

Ophthalmic Hospital, cauterised the canal in its whole length, and thus cured the epiphora. In some cases bridles are found across the canal, and the os unguis is not unfrequently attacked. Large doses of iodide of potassium will often effect a rapid cure when the affection is acute. There is sometimes ulceration of the eyelids in the later period of syphilis. Interstitial keratitis is not so rare in adult syphilis as some believe, but is very commonly indeed met with at the Moorfields Ophthalmic Hospital in hereditary syphilis. Cataract is by no means rarely caused in hereditary cases by syphilis; the author has seen several examples of this fact on the operating table in Moorfields.

Loss of vision may be occasioned by caries of the sphenoid, or by syphilitic tumours pressing on the optic nerve. There may be complete loss of vision, too, from changes taking place in the interior of the orbit, and seen by the ophthalmoscope, such as contraction in the size of the arteries and atrophy of the papillæ. In such cases iodide of potassium is often powerless to prevent the supervention of blindness. The author has seen several cases of deafness in hereditary syphilis, but doubts whether deafness is often caused by syphilis in grown-up persons. There are, however, cases on record to prove that such deafness occurs.

ATMOSPHERIC DUST.

IS ITS TOTAL INTERCEPTION ABSOLUTELY NECESSARY FOR
THE PRESERVATION OF HEALTH?

BY FERDINAND E. JENCKEN, M.D., M.R.C.P., M.R.C.S.

As so many erroneous and confused notions are entertained regarding the properties and effects of atmospheric dust upon our physical health, it may not be out of place here to say a few words on a subject which has engaged so much public attention.

Though the presence of minute particles floating in the sun-beam as it traverses a darkened room has long been noticed by philosophers and less scientifically trained observers, yet the revival of this all-important subject is clearly due to the careful and original investigation of Professor Tyndall, who, by the brilliant experiments performed before the Royal Society, has succeeded in displaying the infinitesimal living particles by which we are perpetually surrounded, in an entirely new aspect. The first impression felt was naturally one of wonder, not, however, unmixed with alarm, lest by inhaling these atomistic organisms we might unconsciously lay the foundation of manifold diseases, which, from their insidious manner of entering the system, might leave it wholly out of our power either to forestall or to remedy. It may, therefore, be useful to explain the influences of this atmospheric dust with regard to health and disease, and thus allay the fears with which the germinal theory seems to be invested.

There are countless elements in the atmosphere, which more or less stand in direct opposition to our organism, and which, when coming in contact with it, are apt to disturb its equilibrium, giving rise to sickness, ranging from the mildest to the gravest forms. Many of these, as the effluvia proceeding from ill-ventilated and crowded dwellings, factory dust, bad sewage, &c., are under our immediate control; but these constitute the smaller part, the greater number assailing us despite our most strenuous precautions. But of what nature are these elements? Are they mere dynamic

conditions, clothed in a highly refined ethereal investiture, serving as the feeblest hold for physical concentration, or do they consist of living germs, generated in the atmosphere by the fortuitous combination of forces, requiring but the smallest incentive to be called into being, and brought together by the power of mutual attraction? This question is difficult of reply, yet thus much is certain, that all elements and formations, from the most inappreciable to the most solid structures, must primitively take rise from an arrest of forces which, forming a holdpoint somewhere in the creation, become the focus of future evolution; it is upon these that the vague appellation of influences has been bestowed; a term the more to be regretted, since it fails to be explanatory while affording ample scope for misconception and incongruous theories. Over these we clearly have no control; their subtlety being so great as to defy the densest and most impermeable septa; it is therefore to the atmospheric germs—the earliest visible manifestation of aerial life—that our attention must chiefly be directed.

For convenience sake we may divide them into two groups, the Normal and the Pathogenic: the former constituting that bioplasm of the atmosphere necessary, in conjunction with other influences, for the preservation of our physical integrity; whilst the latter, as antagonistic to our being, may be regarded as the vital source of the greater portion of our ailments.

According to the views of those who believe in the germinal theory, every pathological disturbance, whatever its proximate causes, is principally due to specific agents resident in the atmosphere as distinct organisms, either of a vegetable or animal nature, of a low primitive type, possessing an individual physical character, and endowed with definite properties of growth, culmination, and decay. Typhus, cholera, and the various exanthems to which we are liable, fully prove the correctness of this hypothesis, all of which are dependent upon some characteristic poison, probably of a fungous nature, which, entering the system by any one of its channels, multiplies in an infinite ratio, till the system, imbued with the foreign element, commences its work of expulsion by all the train of nervous and vascular symptoms with which we are so familiar.

It would, however, be inaccurate to ascribe all illness to objective causes alone, our maladies being to as great an extent subjective in their character, and called into existence by certain idiopathic changes that take place in the organism, which, leaning either to the animal or vegetable pole, favour the ingress and propagation

of extraneous germs, and these multiply the more rapidly, the better adapted is the bed prepared for their reception.

We cannot in this instance dwell on certain forms of constitutional disease depending upon a lower plastic tendency of the blood or lymph, or upon a so-called depraved nutrition; these are pathological states, wholly independent of outward circumstances, forming a false centre in the economy—an *imperium in imperio*—by which the harmonious relations of the body, dynamic or physical, are either impaired or altogether destroyed; but whether cancer, tubercle, or fatty degeneration, they must to a certain extent lean to one or other form of primitive life; which is the more probable, as the organism ever rising from the lowest to the highest formation, has a perpetual tendency to relapse into inferior grades of development on the slightest provocation being offered. The mineral character of calcareous degenerations, exostosis, the diseases dependent upon the rigidity of old age, as atheromatous deposits, gout calculus, the rheumatic diathesis, for instance, must not be overlooked; even certain forms of skin disease, as lepra, ichthyosis, and pityriasis, involving the structure of the epidermis and distinguished by their prominently squamous character, come under this denomination, and thus we have the principle of the three kingdoms acting and reacting on the living economy, determining its reciprocal relations, physical or dynamical, either for weal or woe.

To avert or mitigate the evils produced by the contamination of the atmosphere is according to modern science one of the chief objects of hygiene, and the simpler the measures employed for this end, the more generally will they be adopted, and the greater will be eventually the result of our labours.

With this object in view, we may, by ventilation, good sewage, cleanliness, and allowing sufficient space for breathing air, in part remove any noxious ingredients that encumber the atmosphere; whilst we induce a more healthy condition of the system by a free and effective oxygenation of the blood; or we may endeavour in some measure to destroy the life of these atmospheric germs by chemical agents, or resort to mechanical means with the object of filtering the air previous to its entering the lungs, and so rendering it more fit for respiration. This latter mode has been in use from the earliest ages, though scarcely or at all understood; the advantage of the many aromatic and resinous ingredients used for inhalation in the plague and other pestilential disorders, being not

so much due to their slight antiseptic character, as to their being inhaled through a porous medium, as a folded handkerchief or a sponge, upon entering or whilst remaining in the sick chamber.

Consumptive and asthmatic patients instinctively muffle when about to encounter an ungenial atmosphere, and the cough induced by the presence of heterogeneous particles present in the air, is mainly attributable to the instinctive efforts of the lungs to ward off these noxious bodies, and prevent them from being drawn into their tissues; even the habit, constant with asthmatic subjects, of forced expiration, whatever its physiological reason, tends in a measure to clear the atmosphere and render it more fit to pass over the surface of the irritable and weakened mucous membrane.

The various respirators, though originally intended to keep out an extreme cold or raw damp atmosphere, evidently derive their greatest efficacy from their retaining a great portion of the minute particles, animate or inanimate, with which the atmosphere is charged, in the delicate meshes of their structure, thus preventing the diseased and disintegrated tissue of the lungs from being exposed to any injurious influence.

Of all materials hitherto recommended for atmospheric filtration, raw cotton, as has been shown by Professor Tyndall, is decidedly the best; though its general employment for purposes of respiration is to some extent restricted by several practical objections, as being easily clogged with dust, and apt to become offensive by the moisture it imbibes. Nevertheless, it forms a useful eliminator, and may with a moderate amount of precaution be turned to good account.

But its most valuable use is found in the dressing of wounds and large abraded surfaces; all lesions, in fact, of whatever description, may advantageously be protected by this easily procurable substance, which, in addition to its being light and easily borne, admits of the freest exudation of all purulent and sanious matter, while at the same time it acts as a porous medium through which the air can only penetrate in a mediated and purified state; thus being rendered more assimilable by the denuded and cicatrizing tissues; besides which, the cotton, if put on in a thin layer, forms a very desirable crust with the exudation matter, which, where the dressing has not to be removed, greatly helps to accelerate the healing process. I have for years adopted a similar plan; the dry dressing with the necessary modifications being generally followed by the happiest and quickest results; though the

germinal theory, as at present understood, had not been confirmed by positive observation.*

It often happens that we are brought face to face with sickness, without an opportunity to prepare against the inroads of its noxious influence, various as are the means we possess of diminishing the danger of infection; here the raw cotton forms a useful addition to our hygienic armamentarium; by it we are enabled to enter the most loathsome atmospheres with little fear of contagion, the poisonous particles suspended in the air being taken up and retained by the delicate hook-like fibres of the cotton.

In the case of the contagious maladies, isolation either entire or partial, as recommended by the late Sir James Simpson, is one of the most potent means we possess of arresting the spread of sickness and lessening the danger of infection.

I cannot here refrain from alluding to the Cottage Hospital plan, which, despite the formidable opposition it has encountered, possesses enormous advantages over the large ward system, and when universally adopted and thoroughly organized in all its practical details, will greatly tend to hasten the cure of the sick, as well as diminish those evils by which the rate of mortality in hospital practice is so fearfully increased.

Yet interesting and instructive as these facts and inferences may be to the experimentalist and practical physician, the important question is, (no matter what the constitution of the air,) to what extent is atmospheric influence beneficial or injurious? And having ascertained this, how far are we justified in intercepting the same?

All who are acquainted with comparative anatomy and zoology will fully agree that man's organism, though an independent structure of its own, is more or less indebted for its maintenance to the three natural kingdoms, upon the ample basis of which it necessarily rests; the minutest fibre of its complex tissues deriving its supply, not merely from infinite physical and chemical sources, but from countless living channels from without; it being imperative that, as an organic pile, its resources, besides depending upon inert

* It would be of considerable importance to ascertain whether gun cotton, from the peculiar and rapid process of oxydation to which it has been subjected, might not be advantageously employed in the covering of fetid and troublesome sores; though doubtless, on account of its highly explosive character, the greatest caution would have to be exercised in its use.

agencies, should be essentially of a vital character. Though the grosser needs of the body are provided for by the food we consume, which being assimilated is converted into the life element of blood, again to be transmuted into the various textures of the organism, it is no less certain that the greater part of our sustenance is derived from more delicate agents, which, instead of entering by the *primæ viæ*, penetrate the system by finer channels, the medium being either the surface of the skin or lungs. Through the respiratory organs, therefore, constituting the hearth of the motor principle in the economy, the greatest exchange between the effete elements of the body, and the vivifying influences of the external world, must be negotiated; hence their high importance, not only physiologically in regenerating the heat lost by the wasting of the tissues and refitting the blood to return into the circulation, but also in a physical respect by the means they afford of introducing into the system materials both dead and living, either as minute particles floating in the inspired air, or as mere influences vested in a highly refined and gaseous form. The lungs would therefore ill perform their functions were they merely chemically and mechanically to admit atmospheric air deprived of all impurity; a certain alloy of adventitious matter, as has been just now shown, being as indispensable for the carrying on of the functions of the body, as is the nutriment that enters into the system by the portal of the digestive apparatus. This, to be truly wholesome, should be of a mixed kind, allowing a certain margin for extraneous substances, which despite their comparative inertness exercise a beneficial influence upon the habits and peculiarities of the constitution, the exact reason of which has, as yet, not been ascertained.

It will thus be seen that atmospheric dust, so far from being foreign to the atmosphere, forms a legitimate and component part of it, and may, provided the surrounding conditions be genial, be breathed with comparative impunity; the spongy texture of the lungs acting as the best eliminator of all noxious matter, and being by no means so sensitive to extraneous influences as might at first sight be supposed.

The same line of argument applies with equal force to all dietetic and hygienic rules, it being by no means required that we should abstain from exposing ourselves to every kind of external influence from a morbid dread of its eventually proving injurious to our physical welfare. Heat and cold, light and darkness, sleeping and waking, are, in their opposite tendencies, alike essential for the

development of the polar principle dominant through all the creation ; and the numerous vicissitudes to which we are subject from without, though they should; if possible, be so tempered and softened down as to be readily borne, ought never be so far annihilated as to prevent the economy from exercising its legitimate right of mediation. How many are not the trials and afflictions that assail us from without, and how perpetually have we not to strive against the many evil desires and propensities that are ever warring against our better self and nobler aspirations! But, far from placing ourselves entirely beyond the sway of temptation, and leading a passive and a useless life, we should teach ourselves boldly to encounter adversity, so that, when evil does befall us, it may find us prepared and able for the conflict.

CLINICAL NOTES.

BY D. MACKINDER, M.D., F.R.C.S.

RUPTURE OF THE BLADDER.

OF all the ills to which our poor flesh is heir, there is not one whose every aspect is more truly alarming and whose every feature is more deplorably discouraging than rupture of the bladder. Luckily, it is an accident of very rare occurrence, and, except as the result of external violence, it may not often be seen again. Still, however improbable it may be possible, and before another twenty-four hours have passed away, the same combination of circumstances as will be hereafter detailed may demand the earnest attention of the least accomplished of our surgical craft. To be forewarned is to be forearmed, and hence my apology for reporting this case; and should it happen that any member of our Society becomes the happy means of prolonging a useful life through the warning note which I am about to sound, my time and his time will not have been badly spent.

William C., aged twenty-eight, a shoemaker, married, the father of two children, of slight build, emaciated, and exsanguinous, lived in W. Street, Gainsborough. About three years ago, just as he had recovered from a severe gonorrhœa, he received a kick on the perineum while playing at football. Three weeks afterwards he had retention of urine, for which he was catheterised at the Hull Infirmary, the size of the catheter not being recollected. From that date to the time I was summoned to attend him, December 20, 1863, micturition had been difficult, the stream of urine being small and constantly dribbling. December 19, the day before I was sent for, in consequence of a complete retention of urine, my patient and a learned herbalist whom he had consulted tried to pass a bougie, but failed. Whilst straining violently, about eight p.m. the same day, he said "something broke in his body, and he was immediately seized with violent pain." Mr. Fairchild, surgeon,

who was then sent for, found him in a state of approaching collapse, and gave him a draught of chloric ether and landanum. The pain having been excruciating all night, an opiate was administered in the morning, and while in a hot bath a little urine was voided. At one p.m. he was seen by my assistant, Mr. Morton, to whom I am indebted for the accompanying excellent sketch. He was then quite sensible, and free from pain, so long as he was kept perfectly still. The abdomen was tender, especially below the umbilicus; there was dulness on percussion over the pubic region, and near the surface there was a distinct and diffused fluctuation. Mr. Morton endeavoured to pass a No. 7 silver catheter, but did not succeed, in consequence of a stricture in the spongy portion of the urethra. A No. 5 gum-elastic catheter passed as far as the bulb. At four p.m. I accompanied Mr. Morton to the case, and tried to introduce Nos. 2, 3, and 4, but failed. The poor fellow was then able to stand, but said he felt faint, and vomited several times. At ten p.m., having again failed to pass a catheter, I punctured the bladder in the mesial line above the pubis, and gave slow exit to fifteen ounces of dark ammoniacal urine, to the great relief of my patient. The canula was secured.

December 21.—He slept a little in the night; more offensive urine passed through the canula, and about an ounce by the urethra in drops. Ordered a saline mixture, with opium and camphor julep, every four hours.

December 22, ten a.m.—He was semi-comatose. At five p.m. he could not speak; he was restless; his pupils were dilated and inactive; his pulse 120, feeble; but he could drink and take his medicine.

December 23, four p.m.—He had not spoken since the last visit, but continued to take his beef tea, gruel, and wine without difficulty. Pulse 118, feeble; respiration audible, catching. Six ounces of strongly ammoniacal porter-coloured urine were drawn off.

December 24.—He died comatose at eight a.m.

Autopsy, four hours after death.

A rough dissection of the perineum showed intense congestion and extravasation of blood, but no effusion of urine. A section of the abdomen exhibited extensive disorganisation; the recti muscles were a dark chocolate colour, pulpy below the umbilicus, and infiltrated with urine. The pelvic attachment of the peritoneum was undermined by urine, and the subjacent parts were putrid; portions of the bowels were glued to the parietes, and the whole cavity of

the abdomen bore evidence of inflammation. The bladder was contracted, and a rupture was found on its left side, anterior to and below the reflection of the peritoneum. No other opening could be found. The trocar had not perforated the bladder, but had entered a large cavity formed by the urine in front of that viscus. The rupture was round, admitted the fore-finger, and had a ragged, bevelled edge on its outer aspect, surrounded by small, bright purple-coloured spots. The walls were enormously thickened, the mucous coat generally congested, and the projecting surfaces of the corrugations were blackened. The kidneys were large, weighing six ounces each, and the hiluses and ureters were dilated. The prostate also was large. A section of the urethra exposed a *cul de sac* at the junction of the spongy with the membranous portion; behind this and a little to the right side there was a false passage extending into the membranous portion, and so small as scarcely to admit a pin. In this minute passage a small triangular calculus was curiously impacted. Lower down there were two false passages—one an inch long, which entered the bulb; the other, still longer, being lost in the mucous membrane. Excepting the contraction near the bulb, the canal was normally capacious. (See Plate II.)

Remarks.—There are several points of interest in this case. The origin of the disease, a kick while the urethra was in an unhealthy condition, its probable consequences being unperceived and disregarded. The neglect of skilled treatment after the warning which sent the man to the Hull Infirmary for temporary relief. The quacking, the poking, which he endured by one of those pests of society which an enlightened civilisation not only tolerates, but encourages, nay bribes! *Populus vult decipi; decipitur.* The protracted suffering; the extent of the mischief; the remarkable accidents which began and ended the chain of events; the football, the rupture of the bladder and its immediate cause, that insignificant mite which expanded into the perilous mountain over which this poor fellow could not climb!

The fact of there being no extravasation of urine into the perineum, and of the trocar being freely moved about in a cavity in the region of a distended bladder, and of a considerable quantity of urine escaping through the canula after the puncture, will not fail to call attention to certain difficulties of diagnosis. The operation was performed forty-eight hours after the patient felt "something break," and eighty-four hours before death took place.

At first, the rupture of a few fibres of the bladder was suspected, but the true and fearful nature of the accident was soon revealed.

Ignorance, criminality, credulity, shame, vice, and stupidity, played their several parts to perfection in the brief melodrama of this poor fellow's existence. *Requiescat in pace.*

A NEW INSTRUMENT FOR LITHOTOMY.

Though the catalogue of the *Armamenta Chirurghi* is already very long, and comprehends almost everything which ingenuity can devise for the relief of human suffering, I have ventured to swell the list by an instrument which, I think, in the hands of the lithotomist will prove not the least useful of its class.

If in the performance of an important operation delicate manipulation be of any avail, the instrument which I am about to introduce must speedily win its way, since by its use not only time but pain will be saved. Instead of introducing the sound, the catheter, and the staff, as some do when about to cut for stone, one introduction of my instrument will suffice, for it comprehends the three instruments named. It is made of steel, perforated as far as the groove, into which the blade of the scalpel slips, and has a solid distal extremity. The groove is central or lateral, for the median or lateral operation, and is shorter than those generally made, the long grooves being not only unnecessary, but objectionable, on account of the easy escape of the fluid from the bladder. For the perforated staff there is a stilette, with plug which can be retained or removed at will. The proximal end is funnel-shaped to admit of the pipe of the syringe for the purpose of injecting the bladder with water, when thought expedient. The curve is long, goes well into the bladder, and approaches the rectangular form.

The instrument was made for me by Wood, of York, and was exhibited in September last at Brigg, to the East York and North Lincoln Branch of the British Medical Association.

AN UNUSUAL CAUSE OF DEATH.

Notwithstanding the great and rapid progress which has been made in our knowledge of the healing art, in anatomy, physiology, pathology, chemistry, and the like, much remains to be done, and many long years will yet have to pass away, before even the most gifted of our craft has mastered the work by which he strives to

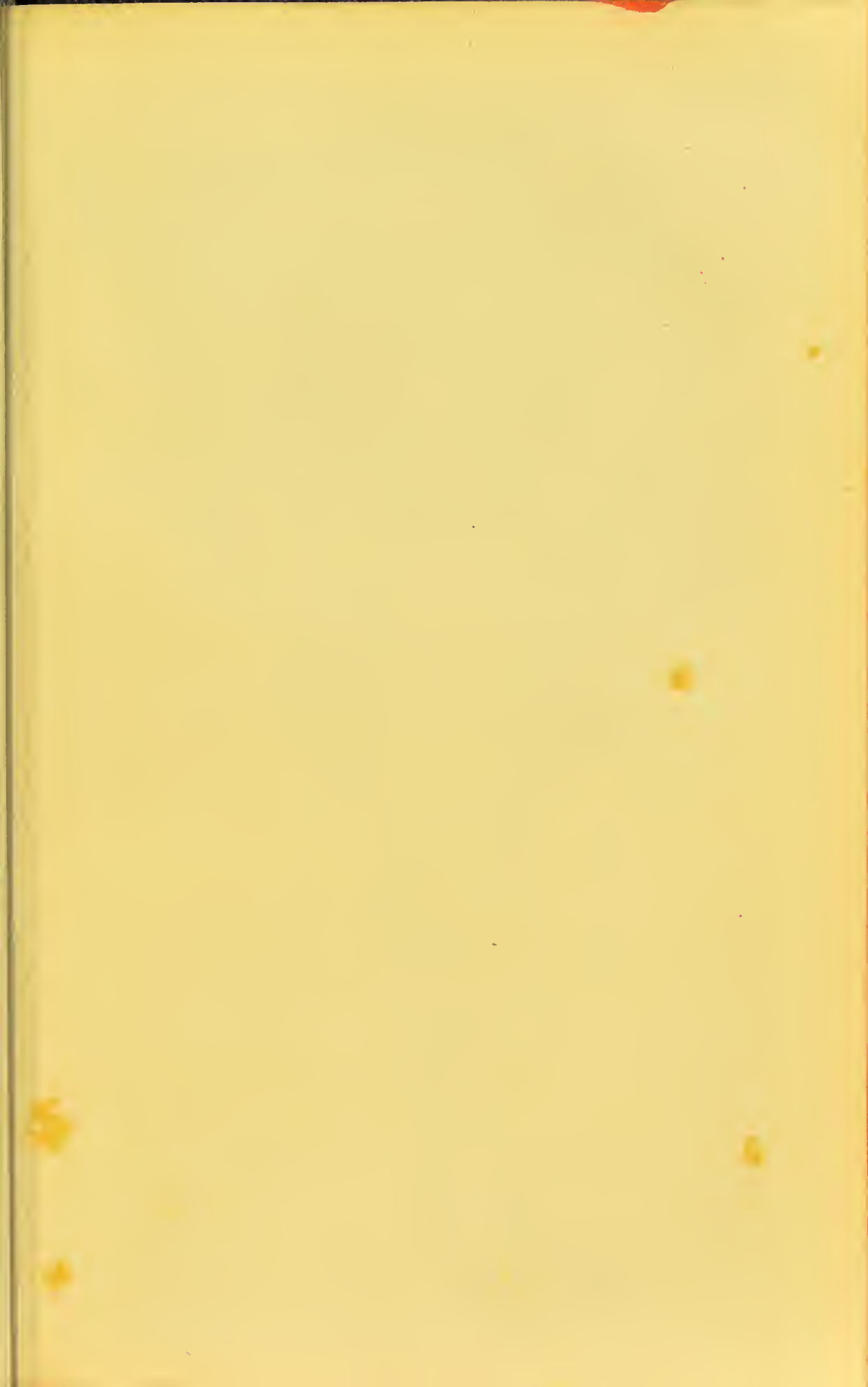
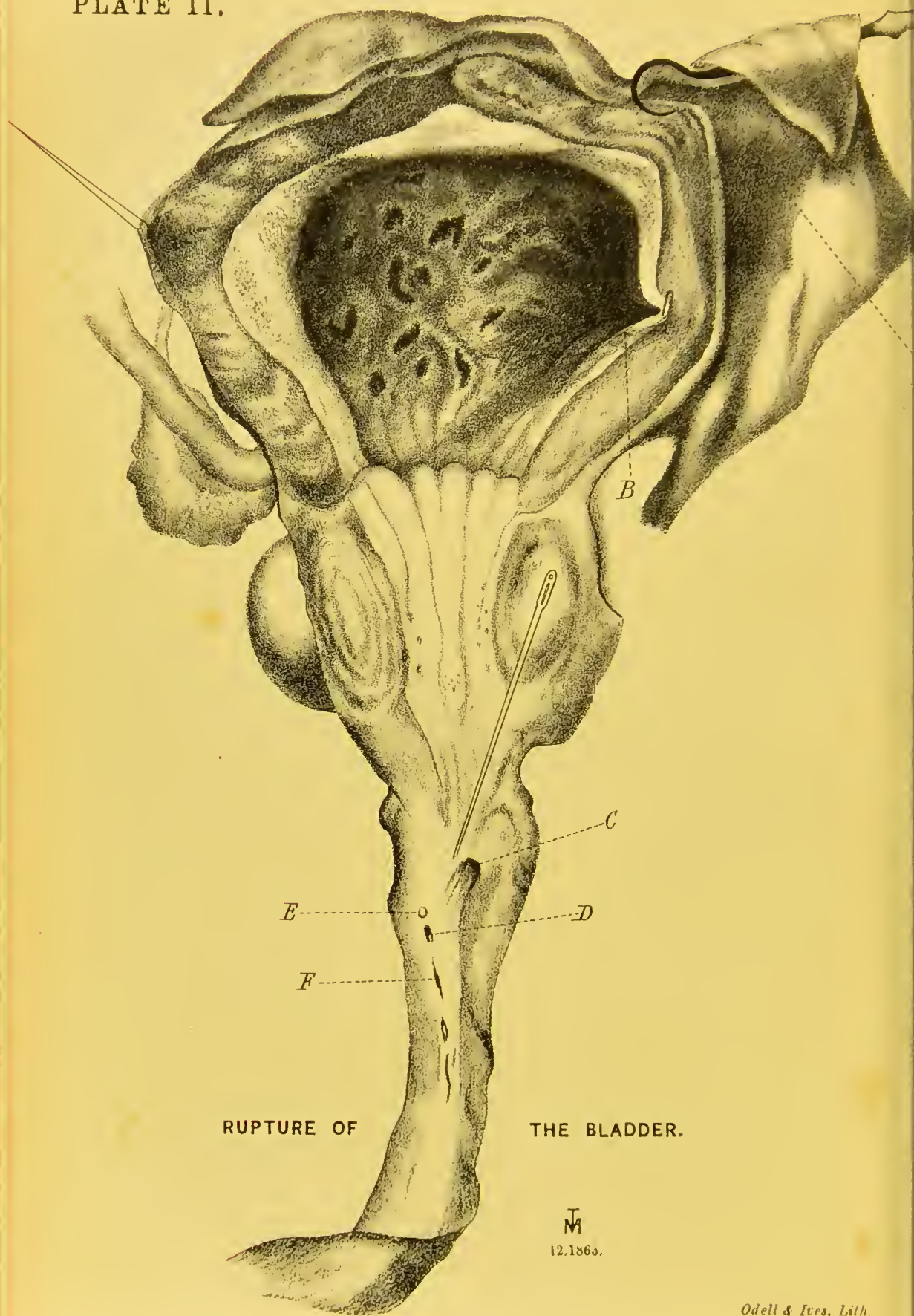


PLATE II.



RUPTURE OF

THE BLADDER.

J. M.

12.1865.

DESCRIPTION OF PLATE II.

- A*—Vesical Reflection of the Peritoncum, forming a part of the Sac.
B—The Rupture.
C—Cul de Sac.
D—False Passage opening into the Urethra; the Probe showing its course.
E—Calculus imbedded in the same.
F—Passage into the Bulb.

earn his reputation and his bread. Through the prying skill of ingenious minds our means of diagnosis have been so wonderfully augmented that the tyro of to-day laughs at the sage of fifty summers gone by. Still mystery survives, and ever and anon we are compelled to acknowledge ourselves restrained by our wit's tether; and the scalpel alone reveals, for our conscience's comfort, the cause of a restless spirit's flight.

Case.—J. R., a small farmer, aged sixty-one, married, returned home from his work at the usual hour in the evening, sat down on a chair, and was observed by his housekeeper to place one hand on his chest and the other to his head, as if in pain. He then fell down and rolled over on his face. His housekeeper, being alarmed at what had happened, ran to a neighbour for assistance and came back in about fifteen minutes. He was then found lying in a prone position with his face on the floor, and when raised he appeared to be dead. About three hours previously he had had a full meal. He was a steady man, was quite sober at the time, apparently in his usual health, and, it was stated, had not complained of pain or illness of any kind for years.

An inquest was held, and, by order of the coroner, a post-mortem examination was made twenty hours after death. The *sectio cadaveris* was performed in my presence by my assistant, W. Henderson, M.D., to whom I am indebted for the notes of the case. After searching in vain for the cause of death in the abdomen and thorax, the head was opened, much to the annoyance of the poor man's friends, who had jumped to the conclusion that he died from disease of the heart and that only.

The body was well nourished. Marks of two bruises were found on the skin, one on the right cheek and the other on the right supra-orbital region. These marks had a peculiar parchment-like appearance, as if caused by pressure which had been kept up until death. There was no obstruction nor any foreign body in the mouth or larynx. The lungs were free and crepitant, but slightly congested; the pericardium, heart, and great vessels were normal; the stomach was healthy and contained a tolerable quantity of partly digested food; the liver and other viscera had no traces of disease, but on the right side posteriorly some old adhesions were discovered between the visceral and parietal layers of the peritoneum. On opening the head the calvaria was found to be strongly adherent, but there were no marks of injury externally or internally. The Pacchionian bodies were very numerous. The

dura mater, which was removed with the falx cerebri close to the line of attachment, presented nothing peculiar on first examination, save a slight opacity of its serous surface; afterwards, projecting from its internal surface and forming apparently a part of its serous lining, there was found a sharp spicule of bone. This spicule, about six lines in length, was lying transversely embedded in the dura mater, its thick end forming a part of the floor of the superior longitudinal sinus, and its sharp extremity pointing towards the left hemisphere. The arachnoid membrane was opaque, and, for several inches over the left hemisphere, was covered with a milky deposit, but there were no adhesions. The left lateral ventricle contained more fluid than the right. The vessels of the periphery and substance of the brain seemed to be healthy.

Theory of the Death.—The conclusion which Dr. Henderson and I came to was that this abnormal development of bone caused a fit; that the deceased during the fit rolled over on his face on the floor; that that position being maintained for some few minutes, ten or more, so impeded respiration as to increase the amount of blood in the brain, and thus favour death by asphyxia. Verdict accordingly.

The preparation of dura mater and bone was shown to Dr. Littlejohn, Lecturer on Medical Jurisprudence at Edinburgh, and he at once recognised the morbid appearances as being similar to those which he had seen in the case of a prisoner who was found dead in a police cell. Physiologically, the case is interesting with reference to the conditions which influence the development of bone in fibrous textures; and pathologically, from the influence exerted by abnormal growths over contiguous and distant organs. It is worthy of notice that the situation of the spicule was just where we expect to find the Pacchionian bodies, the number of which increases as age advances. In Müller's archives, 1852, Luschka remarks that these bodies are developed from the normal villi of the arachnoid membrane, and is it beyond the range of possibility, nay probability, that ossification is the simple result of a perverted action of one or more of them? When examining the membranes and brain of a lunatic a short time ago, I found on the free surface of the arachnoid some minute gritty particles of the consistency of cartilage, which seems to bear out the idea that these villi occasionally take on ossific action. Had the particles been in considerable numbers, or free and floating in the serum, their origin might be accounted for in a different manner; but only two or three

were found, and these seemed to form part of the free surface of the membrane. The sharp end of the bony spicule would impinge on the left hemispherical membranes and cause pain; Bochdalek and Luschka, it will be remembered, having traced out in the arachnoid narrow filaments from the portio minor of the fifth, and the facial and accessorius nerves. This is one of the many examples of pain felt in one part interfering with the functions not only of the part itself, but of adjacent and more distant organs also. In this instance the brain was the offended organ, and as its controlling power was in abeyance, it is not difficult to perceive how convulsions were suddenly set up. Unfortunately the housekeeper left Mr. R., to seek assistance at the very moment when she was most wanted, and her absence deprives us of the means of knowing whether there was tonic or atonic spasm or any spasm at all. As to the probability of this poor man's recovery had he been laid on his side and properly attended to, those who are fond of interesting discussion may here tarry awhile. The continued application of the exciting cause would, in my opinion, have had none other than a fatal termination.

It ought to be observed, as was remarked by some of the jurors, that some years ago this man and his brother used often to quarrel, and believing, I presume, their heads to be the least important parts of themselves, *they* came in for *capital* punishment!

ON DIPHTHERIA, AND THE DISEASES ALLIED TO IT, OR WHICH MAY BE MISTAKEN FOR IT.

BY ROBERT HUNTER SEMPLE, M.D., M.R.C.P. LOND., PHYSICIAN
TO THE HOSPITAL FOR DISEASES OF THE THROAT.

ABOUT the year 1857 it began to be mentioned in medical and general circles that a new disease had made its appearance in some parts of France, and especially at Boulogne, where it had attacked and carried off some of the English visitors. Before the alarm and surprise occasioned by this unwelcome news had subsided, it was announced that the same disease had appeared, although in a sporadic form, in many parts of Great Britain, beginning near the coast of England, as in the counties of Kent, Essex, Suffolk, and Norfolk, and gradually extending to the interior of the island. At first, it was thought by the medical profession that the disease was not really new, but only a severe form of some well-known complaint, and, as I can testify from actual conversation with some distinguished physicians at that period, that the existence of any special or peculiar malady as a visitor to this country was almost entirely disbelieved. But so many cases continued to present themselves that attention was at last awakened to the subject, and in the year 1858 I was appointed to collect together and to edit, for the New Sydenham Society, whatever memoirs were in existence on the subject of this peculiar affection, attacking the throat and exhibiting an extraordinary and rapid fatality in many cases, and which had spread alarm over the country.

On entering upon the task I found that the literature of the subject was exceedingly meagre, and unquestionably none of the English text-books on the Practice of Medicine, existing at the date to which I allude, made any mention of an affection corresponding in its features to the newly described epidemic; and even among the works specially devoted to the diseases affecting the throat and air-passages, no descriptions could be found which exactly represented its symptoms and appearances. Among scattered mono-

graphs, it is true that some epidemics were described, which bore, in many respects, a resemblance to the new disease, and some of their symptoms were noted; but, as will be hereafter mentioned, the descriptions were too vague to be accepted as accurate representations of any special affection, or they were so obviously superficial and imperfect as to merit very little confidence. In fact it was only in France where anything like accurate definitions of the unwelcome visitor had been laid down; and subsequent information proved that the French physicians had really understood and described a disease which had existed some years on the other side of the Channel, but which had not, up to the year 1858, been known or at least been recognised as a distinct malady in our own country.

The most important, and the first in point of time, of the French contributions to our knowledge of this new disease, consisted of a series of memoirs by Bretonneau, a physician practising at Tours, who had observed several epidemics of the malady which had occurred in that town. So little, however, were Bretonneau's researches appreciated or understood in this country, that not a copy of his work could be procured for the purpose of my edition from any of the usual sources of supply; none of the foreign booksellers had the book, nor were they able to procure it; and even the French physicians in this country, to whom application was made, had no copy in their libraries. It was only by the kindness of the Medico-Chirurgical Society that I obtained the loan of the single copy which its library possessed, for the purpose of my collection of Memoirs. The College of Surgeons of England has a copy of Bretonneau's Memoirs, but I very much doubt whether a copy exists anywhere else among the public or private libraries in this country, and, as far as I know, the collection of "Memoirs on Diphtheria," edited and translated by me for the New Sydenham Society, and published in 1859, constitutes the first complete contribution to the knowledge of the French doctrines on the subject in the British language. During the preparation of that work, however, the study of the newly described disease was pressed upon the mind of the profession by its increasing prevalence, and since the publication of the New Sydenham Society's volume, the contributions by British writers to the history of the affection have been both valuable and numerous.

The transition from the extreme of undue scepticism to that of excessive credulity is by no means uncommon, and while in 1858 and 1859 I found that only few people, professional or lay, believed

in the existence of Diphtheria as a special disease, it would seem, from public records and from private conversation, that no malady is more common at the present day. Diphtheria now forms a most important entry in the General Registry of mortality, and if we may believe the statements of patients, an enormous number of persons have suffered from this disease, from which, however, the greater proportion have entirely recovered. As I neither disbelieved in the existence of Diphtheria in 1858, nor believe in its very general prevalence in 1871, I have written the present paper to point out as clearly and as briefly as possible what the disease really is, and what are the other affections with which it is often confounded, and with some of which, perhaps, it occasionally co-exists. I may at once state my opinion that Diphtheria, although a distinct form of disease, is still comparatively rare, but that, when it occurs, it is a malady of the most dangerous and often fatal character.

In this country Diphtheria has almost always assumed an epidemic character, and although it is no doubt contagious under certain circumstances, the instances of its actual communication by contagion are not very numerous. It cannot be said that the occurrence of the disease in any given locality can be traced to any known conditions of insalubrity, and indeed some of the most apparently healthy spots have been among those where Diphtheria has shown itself in its most fatal form. Looking at my own experience, which I believe will be confirmed by the evidence of other physicians who attend large numbers of patients, especially in hospitals and dispensaries, the close, confined, and ill-ventilated abodes of the poor in this metropolis by no means offer any large proportion of cases of Diphtheria, while the disease very often develops itself in the open parts of the country, where the hygienic position is unexceptionable. While, too, the poor contribute their supply of cases of the disease, they do so in by no means large proportions; and the better classes, who are surrounded with the necessities and comforts of life, have often suffered grievously from the ravages of the malady. For myself, I may state that although I have been engaged for many years in extensive dispensary or hospital practice, and have been watchful to note every case of Diphtheria which might present itself, I have seen comparatively few instances among the poorer class of patients, while most of the cases which I have attended have been among the better classes who come under notice in private practice.

The first cases of Diphtheria which I myself observed occurred at Bagshot, in Surrey, in the year 1858, while I was preparing the volume on Diphtheria for the Sydenham Society. The chief features of this epidemic visitation were the following, stating the facts in as condensed a form as possible, and noticing both the positive and the negative signs of the disease. The persons chiefly attacked were children; the onset of the malady was insidious; there were none of the usual symptoms of fever; there were certainly none of the distinctive marks of scarlatina; the only distinguishing character on which reliance could be placed was the existence of a pellicular exudation on the tonsils and soft palate, and death was frequently sudden and unexpected, sometimes apparently from syncope. I made post-mortem examinations of the cases which proved fatal, and I exhibited the specimens to the Pathological Society, where specimens were also shown by other members. Since that time I have seen many cases of the disease, and very many more cases which were said to be Diphtheria, but which were not really so, and the following remarks are intended as a contribution to the history and diagnosis of the malady in question.

HISTORY OF DIPHTHERIA.

Bretonneau has devoted much research and exhibited great learning in tracing the descriptions of disease found in various medical writings and compiled at different periods, and which he refers to Diphtheria, although not described by the authors under that name. He conceives, for instance, that Aretæus has depicted it in an account which that writer has given of an affection occurring in Egypt and Syria, and called the Egyptian or Syriac ulcer, and which seems to have chiefly attacked the tonsils. But Bretonneau does not maintain that, with this exception, any authentic records of the existence of a disease resembling Diphtheria can be found before the end of the sixteenth century, since which time he thinks that it has constantly shown itself in every region of the old or new continents. It continued for a long time in Spain, and subsequently in Italy, and a large number of persons died of it in Naples. Towards the middle of the last century, the epidemics of the disease occurred more or less frequently in France, Sweden, and America, and it is said that Washington lost his life from an attack of the malady. The authors who have entered into details un-

doubtedly show that the pellicular or pseudo-membranous exudation existed in many of their cases, which Bretonneau would include under the head of Diphthérite, but still the descriptions in several instances are meagre and unsatisfactory, and leave us in some doubt whether they really refer to the same affection as that described by Bretonneau; and it is even doubtful whether the scorbutic gangrene of the mouth and the malignant angina, both of which Bretonneau himself seems to consider as identical with Diphtheria, are not different and distinct affections from those which are now included under that term. It is now generally admitted that the disease which was elaborately described by our countryman, Fothergill, was not Diphtheria, but a form of malignant scarlatina, a distinction which is clearly pointed out by Bretonneau.

Bretonneau first observed the disease at Tours, where he resided, and where on several occasions it occurred as an epidemic, the first outbreak being from 1818 to 1821; and in the last named year Bretonneau read two of his memoirs on the subject before the Académie de Médecine, but these communications were not published till 1826. Other epidemics succeeded, and were described by him in subsequent memoirs, in which he developed his views relating to the pathology, diagnosis, history, and treatment of the affection. He called it Diphthérite, from the pellicle (*διφθήρα*) which characterised the disease, but English writers have adopted the word Diphtheria, as a corresponding expression, avoiding the termination in *itis* as probably implying an inflammatory origin, a point which is not at present proved.

Since the publication of Bretonneau's memoirs, the disease which he describes as diphthérite appears to have prevailed very extensively, though at different intervals and in different localities, in France, and many French authors and a few German ones have written monographs and treatises describing the affection under the name proposed by Bretonneau, but, as I before observed, hardly any English writer alludes to the disease under the new name. Dr. Conolly, however, in a review of Bretonneau's memoir, in "The London Medical Repository" of 1826, relates some particulars observed by himself at Tours, when watching an epidemic of the disease, and Dr. Mackenzie, in an article on "The Symptoms and Cure of Croup," published in the same year, although he does not employ the word diphthérite, describes a condition of the throat and windpipe corresponding to Bretonneau's definition of that affection. It may be stated, therefore, in general terms that diphthérite, as a

distinct affection, was not recognised in this country until about the year 1857, although many French writers had adopted Bretonneau's views, some had partly contested them, but all had admitted the facts which he had described. That a peculiar epidemic had broken out at Tours in 1818, and that a similar outbreak had frequently occurred in France, was incontestable, but it was not universally conceded that gangrenous sore-throat was, as Bretonneau maintained, the same disease as diphthérite, nor was even his proposition that croup and diphthérite were identical, received in all quarters without hesitation among French physicians.

But while the opponents of the identity of croup and diphthérite in France were very few, those who admitted this identity were very numerous, and their authority was very great. Trousseau, in particular, who was a pupil of Bretonneau, entirely adopted the views of the physician of Tours; Guersant, in the "*Dictionnaire de Médecine*," in 1835, writes of croup as synonymous with tracheal diphthérite; Bouchut, in his "*Traité Pratique des Maladies des Nouveaux Nés et des Enfants à la Mamelle*," in 1852, regards croup as the "diphthérite of Bretonneau," and describes it as such; Empis, in an article of the "*Archives Générales de Médecine*," in 1850, who had witnessed an epidemic of the disease in the Hôpital Neckar in 1858, also completely endorses the views of Bretonneau as to croup and diphthérite being the same disease; and Daviot, in an historical account of an epidemic observed by himself in the Department of the Saône-et-Loire, and in that of La Nièvre, in the years 1841, 1842, 1843, and 1844, also regards croup as a form of diphthérite, and calls it croupal diphthérite. Rilliet and Barthez, the well known authors of the work on "*Les Maladies des Enfants*," in the article, "*Angine Pseudo-Membraneuse*," published in 1853, consider croup and the form which follows pseudo-membranous angina, or sore-throat, as identical, but they dispute Bretonneau's accuracy, and I think justly, in confounding diphthérite with gangrenous affections. On the other hand, the French writers who deny the identity of croup and diphthérite are very few, and those appear to have had very little, if any, practical knowledge of the affection. I cannot, at present, find any French writer of authority, whose objections against the identity of the two affections are worth recording. But the objections against admitting the identity of diphthérite with gangrene of the throat are very strong, and in this respect Bretonneau's views are not generally received by his compatriots.

In Great Britain, among the numerous medical writings which appeared between 1826 and 1857, the name of Diphtheritis hardly ever occurs. Among the exceptions to this observation, however, are the reference to the diphthérite of Tours by Dr. Conolly in 1826, and occasional monographs regarding local outbreaks of the affection by some medical writers in the English and Dublin journals. Among the systematic treatises on medicine published in Great Britain up to the later period just alluded to, diphtheritis finds no separate place, and the authors of those works, when they allude to diphthérite at all, usually argue that it is not the same disease as croup, and they sometimes point out the diagnostic marks which they regard as distinguishing the two diseases.

Since 1857, however, the disease has become so prevalent in Great Britain that its special features have been almost universally recognised, and the points at present open for consideration are its exact nature, its causes, its mode of propagation, and its treatment, on all of which some uncertainty still prevails.

PATHOLOGY OF DIPHTHERIA.

It may be stated in general terms that the essential feature of Diphtheria consists in the production of a pellicular exudation on some part of the surface of the mucous membrane or of the skin. The disease generally begins in the throat, the tonsils, the uvula, and the soft palate being the parts on which it is usually first observed. From this region the disease often spreads in different directions, either downward into the œsophagus, the larynx, the trachea, or even the bronchial tubes, laterally into the Eustachian tubes, or upward into the nose. It has also occasionally been observed on those portions of the mucous membrane which are situated near one of the outlets of the body, as near the anus, on the vagina, or on the end of the penis; but it is remarkable that it does not appear in the interior parts of the body, as in the stomach or intestines. It is also occasionally, although rarely, found upon the skin, and then only under circumstances where the skin has been exposed to some irritation or abrasion, and during an epidemic of Diphtheria. It never occurs upon the skin when the epidermis is entire, but only when the latter has been removed by the occurrence of ulceration, or by the infliction of a wound, or by the application of a blister, or by the friction of one part of the skin against another,

as at the fold of the thigh or behind the ear. Putting out of consideration, for the present, the existence of cutaneous Diphtheria, which occurs only as a secondary or concomitant phenomenon during an epidemic, the primary disease always manifests itself at the back of the throat.

This being the seat of the pellicular exudation, and the region where it must always be looked for, the nature of the pellicle is the next important subject for consideration. It seems to be formed by the effusion, from the diseased surface, of a peculiar fluid of a mixed serous and mucous nature, and concreting into a kind of thin membrane of considerable tenacity and consistency. As soon as one pellicle is formed, another is generated below it and extends beyond its borders, and this second pellicle is raised by a third, which likewise passes beyond the borders of its predecessor, and so on in succession, so as to give rise to a somewhat tough membrane, having a stratified arrangement, in which one plastic layer is superposed upon another. The membrane thus formed is in general easily removed from the subjacent mucous membrane, leaving the latter red and congested, but without any solution of continuity. The separation of the diphtheritic membrane may be readily effected by means of a pair of forceps.

The nature of the membrane itself is not yet very clearly ascertained, and neither general theoretical considerations of pathology nor accurate microscopical examinations have hitherto thrown much light on the subject. At first sight it would seem that the false membrane is identical in its character with that which is effused from serous membranes in a state of inflammation, as, for instance, from the pleura or pericardium; but, in the first place, the diphtheritic exudation is poured out from mucous membranes only, or from abraded skin, and secondly, it is very doubtful whether inflammation is really the agent of the diphtheritic dyscrasia. There are one or two exudations which bear considerable resemblance to the pseudo-membrane of Diphtheria, as, for instance, the buffy coat of the blood, the fibrinous exudation of pleurisy, and the membrane of a blister, and it cannot be affirmed that as yet either chemistry or the microscope has sufficiently distinguished one from another.

But the fibrinous or buffy coat of the blood, besides its fibrinous element, contains some blood corpuscles, both red and white, and is destitute of epithelial scales and pus-globules; the fibrinous exudation of pleurisy, besides its fibrinous network, contains a great

quantity of pus-globules, and is destitute of blood corpuscles; and the membrane of a blister, though containing fibrine, is destitute of blood corpuscles, although it comprises epithelial scales.

The pseudo-membranous pellicle of Diphtheria has been very carefully examined microscopically both by French and English observers. It contains fibrinous filaments closely interlaced together, some pus-globules, and very numerous epithelial scales. Dr. J. S. Bristowe, in a very elaborate Report on the "Morbid Anatomy of Diphtheria," in the tenth volume of the Transactions of the Pathological Society, regards the diphtheritic exudation as being essentially composed of epithelium and coagulated lymph, the latter resembling that poured out on serous membranes, and consisting of a network of fibres. The only distinction he can draw between the fibres of the diphtheritic exudation, and those of a false membrane on a serous surface, is, that in the former the fibrillæ are more minute; but even this distinction he thinks more apparent than real. He always observed, he says, that the free surface of the diphtheritic membrane is made up chiefly of epithelium, and the deep almost exclusively of fibrine; from which it would appear that the effusion first poured out from the mucous surface entangles the epithelial scales, and that the subsequent effusions accumulate between the true epithelial layer and the basement membrane, becoming successively more and more free from entangled cells, and more and more purely fibrine. Dr. George Harley, however, who also has made microscopical examinations of the diphtheritic exudation, denies the existence of fibrine, and regards the membrane as essentially composed of cells. On the whole, while admitting that the diphtheritic exudation contains abundant epithelial cells and scales, with some plastic material binding them together, I think it very doubtful whether microscopic research throws much light on the true nature or pathology of Diphtheria.

Another question of equal or greater importance in reference to this disease, is, whether it is to be regarded as an inflammation. The French writers all answer the question in the affirmative, but in Great Britain the inflammatory character of Diphtheria appears so doubtful, that, as has been mentioned, the word *diphthérie* has been discarded as possibly indicating its inflammatory nature. It is, however, so difficult, in the present day, to define inflammation at all, that none of the usual or ordinarily accepted tests of that condition can be safely applied to the solu-

tion of the present question. If it be admitted that the diphtheritic false membrane is essentially similar to that thrown out in pleurisy, one argument in favour of the common inflammatory origin of both might fairly be drawn; but if the former be made up only of epithelial scales, with a connecting plasma which is not essentially of a fibrinous nature, then the analogy fails. On the whole, it must be said that the inflammatory character of the deposit itself is not yet established. If, again, we regard the symptoms of the disease, we equally fail to discover the usual signs of inflammation. The premonitory symptoms are in general by no means well marked, nor is there heat of skin, or thirst, or several of the other ordinary signs of inflammation. The pulse is usually rapid, but very weak, and the symptomatic fever is sometimes so slight that the patient scarcely seems ill at all in the early stages of the complaint, and in the more advanced ones the signs are usually only those of local, though very severe, suffering. While hesitating, therefore, to deny altogether the inflammatory origin of Diphtheria, I can by no means admit it to be of such a nature. It seems to me to be a disease *sui generis*, consisting in some peculiar morbid condition of the mucous membrane, and occasionally of the skin, but not necessarily characterised by the phenomena generally classed under the head of inflammation.

Again, Is Diphtheria a local or a constitutional disease? Its constant presence on the soft palate, tonsils, and uvula would at first seem to indicate its local nature, but its appearance in other and often remote parts forbids us to entertain such a supposition; and its rapid propagation to adjoining surfaces from those which it originally attacked, indicates the presence of some constitutional morbid action rendering contiguous organs liable to its invasion. Its appearance on the skin also, on raw or blistered surfaces, during a diphtheritic epidemic, clearly indicates the presence of some specific deleterious agent introduced into the blood. The fact that epidemics of the disease have broken out in many places, quite irrespective of any causes acting directly upon the tonsils or soft palate, points very clearly to the presence of a poison existing in the air and acting on the human system. None of the usual agencies which give rise to the local affections of the back of the mouth and throat can be said to produce Diphtheria; locality appears to have no influence upon the origination or the disappearance of the disease; the weak and the strong seem to be pretty equally liable to its attacks; and the want of sanitary precautions does not

tend materially to develope its presence, nor do the most carefully devised hygienic precautions prevent its appearance.

THE DISEASES FOR WHICH DIPHTHERIA HAS BEEN OR MAY BE MISTAKEN.

Although the history of Diphtheria, properly so called, dates only from the year 1818, when the epidemic observed and recorded by Bretonneau broke out at Tours, it is very probable that it existed long before, although its true nature was mistaken. Bretonneau himself has collected together in his *mémoires* a great amount of historical evidence to show, that, at various periods, epidemics resembling that which he described have appeared in various parts of Europe, but the descriptions are too vague to be depended upon, especially in the absence of well recorded post-mortem examinations and of accurate observation during life. The diseases attacking the visible parts of the throat, it must also be observed, are so numerous, that the peculiar character of Diphtheria may have been very frequently overlooked, and the suddenness of the fatal catastrophe in very many of the cases has probably almost exclusively attracted the attention of observers. Since, however, the features of the disease have been more carefully studied, an opposite fault has perhaps prevailed, namely, to comprise under the general term of Diphtheria very many affections which have no claim to the title. Thus even Bretonneau, as has been observed, seems to have considered it as identical with gangrene of the throat, although he carefully distinguished it from the malignant ulceration of the tonsils which often occurs in the worst forms of scarlatina.

The essential character of Diphtheria, then, being the exudation of a false membrane, almost always appearing first upon the soft palate, and possessing such tenacity and consistency that it may be removed in strips by a pair of dressing-forceps, it is not very difficult to distinguish the disease from other local affections; and yet the mistake has been so often made, not only in former times, but at more recent periods, that the diagnosis demands the most careful inquiry. The following are the affections from which Diphtheria ought to be carefully distinguished, but it must be premised that some of them, although distinct from Diphtheria, may occur as concomitants of that malady.

(1) In Inflammation of the Tonsils, there are very often observed a number of small whitish or yellowish masses spread over one or both tonsils, and sometimes exhaling a very foetid smell. But

these masses are only sebaceous secretions formed in the follicles which abound on the surface of the tonsils. They never cohere into a consistent membrane, and they never extend either into the nasal cavities, or into the larynx. In fact, this common tonsillar affection presents so few points of actual resemblance to Diphtheria, that it scarcely deserves more than a passing notice, and yet it is to be apprehended that the mistake has sometimes been made.

(2) Muguet, or Aphthæ, or Thrush, presents at first sight a considerable resemblance to Diphtheria, but its pathological characters and its physical conditions are totally different. This affection, as is well known, occurs both at the beginning and at the end of life, and is popularly regarded as an indication of failing vital power; and this view of its nature is not altogether unfounded. But it never can be considered epidemic, nor is it in any way contagious. Muguet presents itself in the form of a multitude of small white points, coalescing together so as to form very frequently a continuous layer, which invests the mucous membrane at the back or sides of the mouth, and appears like a false membrane. But if an attempt be made to detach this membrane by a pair of forceps, the object cannot be attained, because the points of which it is composed adhere too slightly to one another to allow of their being brought away in strips. But the whole may be easily removed from the subjacent mucous membrane by means of a sponge, because there is not, as in the case of the diphtheritic membrane, any close adhesion to the underlying surface. In Diphtheria there is very considerable cohesion, and so much so that when the false membrane is removed blood is often effused, which is never the case with muguet. Again, muguet often affects the inside of the cheeks, and never extends to the larynx or trachea, while Diphtheria very frequently extends to the latter structures.

(3) Scarlatina, in its local manifestations on the tonsils, presents several points of resemblance to Diphtheria, and the affinity between the two affections is the more marked, because there is a kind of pseudo-membranous exudation in both. The general resemblance is indeed so obvious, that mistakes have very frequently occurred, and there can be no doubt that the description of some epidemics in former times, referred to outbreaks of Diphtheria, have really referred to epidemics of scarlatina. But the two affections are quite distinct, and probably depend upon totally different pathological conditions. Nevertheless, it is certain that

the two diseases have in a few instances occurred simultaneously. But in the false membrane of scarlatina, as in muguet, it is impossible to obtain strips with the forceps, because the particles which compose it are held together by a very slight cohesion; and, on the other hand, the adhesion of the scarlatinal membrane to the subjacent surface is very slight, so that it can be very readily scraped off. The scarlatinal membrane, again, does not spread as that of Diphtheria does, but remains localized, and there is no instance of its propagation to the air passages. In addition to these special characters, the general symptoms, progress, termination, and sequelæ of Diphtheria and scarlatina respectively, present very well marked contrasts; the onset of the latter being recognised by well-known symptoms of fever, which are often and indeed generally absent in the former; the eruption so characteristic of scarlatina being absent in Diphtheria; death from scarlatina being due to general exhaustion or to the violence of the febrile paroxysm, that from Diphtheria generally occurring from suffocation; paralysis often supervening on Diphtheria, albuminuria generally following scarlatina.

DISEASES ALLIED TO DIPHTHERIA.

While many affections which are really distinct from diphtheria have been mistaken for it, some others which are either closely allied to it, or identical with it, have been excluded from the appellation. The most important illustration of this remark is afforded by the disease called Croup, which, in this country, has hitherto been always considered a specific inflammatory disease of the larynx and trachea, characterised by all the symptoms of inflammatory fever, and terminating by the exudation of a false membrane from the surface of the mucous membrane. I myself formerly always regarded croup in this light, but I have now very strong reason to believe that the disease usually known and described as croup comprises two very distinct affections, one of a decidedly inflammatory nature and not attended by the formation of a false membrane, and the other essentially consisting in the development of a false membrane, but not attended by distinctly febrile or inflammatory symptoms. The first is called by the French writers, and I think correctly, *Laryngite Striduleuse* (laryngitis stridulosa), and the other is Tracheal or Laryngeal Diphtheria. This is no imaginary distinction, but one founded upon the observation of the two affections, and I think that in practice it is most important to draw a line between them

as a guide to treatment, for the remedial measures which would be advisable in the one case, are quite inapplicable and might be very injurious in the other. I have endeavoured for many years to draw the distinction between the two, and I will, in the first instance, sketch from my own experience what I conceive to be two typical instances of the respective maladies.

A child, aged three years, was brought to me at the St. Pancras Dispensary, suffering from some difficulty of breathing, stridulous cough, and febrile symptoms. The case did not appear to be a very severe one, but some medicine was prescribed containing a little antimonial wine. The case indeed attracted very little attention, even from the parents of the child, which improved so much that it began to play about the streets, till four days after I saw it, when the difficulty of breathing suddenly increased, with cough and symptoms of suffocation, and, before medical aid could be procured, the child died. I wish to impress the fact, that, from the first time I saw the child until just before its death, no application for medical assistance was made, the symptoms being so slight as to attract very little attention. But after death I found a tubular false membrane (which I exhibited to the Pathological Society) occupying the cavity of the trachea, and easily detached from the mucous surface, a similar membrane being also found lining the inner surface of the larynx. This case was distinctly one of tracheal or laryngeal Diphtheria, and it not only illustrates the pathology of the disease, but also the insidious manner in which it often makes its attack and hurries on to the fatal termination.

Some little time afterwards I was sent for late at night to see two children (private patients), whose parents were in great alarm in consequence of the children being seized rather suddenly with stridulous cough, great difficulty of breathing, great heat of skin, thirst, and all the symptoms of inflammatory fever. They were in fact affected with what would have been described, and is described still, as croup or tracheitis. I remained several hours with the patients in order to watch the progress of the cases, and the effects of the remedies. These consisted in the administration, at frequent intervals, of ipecacuanha wine, and the use of the warm bath. In process of time, vomiting was produced, the pulse was lowered, the skin became moist, the cough was relieved, and the breathing became quiet, and the next day the patients were much better. But the next night the symptoms returned, and were treated in the same manner and with the same success, and eventually the children

entirely recovered. Now these last cases—and I and all other practitioners have seen very many such—were instances of Laryngitis Stridulosa. If croup is an inflammation of the mucous membrane of the larynx and trachea, *attended or followed by the exudation of a false membrane*, then these cases were not instances of croup; and I believe that most of the so-called cases of croup are not attended with the presence of a false membrane at all, and that the danger of such a membrane being formed is imaginary. It must be observed also, that, while the symptoms of tracheal Diphtheria are often very insidious and but little marked, those of Laryngitis Stridulosa are very prominent, and it may almost be said that the danger of the two affections is in the inverse proportion to the violence of the symptoms.

How then is the erroneous opinion as to the nature and pathology of croup to be explained? I think that it is not very difficult to do so when we recollect that in the great majority of cases, namely, those of laryngitis stridulosa, the patients recover, and that there is therefore no method of determining in such cases whether any false membrane has been formed, or has been in progress of formation; while, on the other hand, the instances of Diphtheria attacking the larynx and trachea are generally fatal, unless when the false membrane is vomited by the use of emetics, or is mechanically removed, as has been often done in France, by the operation of tracheotomy and extraction by the forceps. In short, I believe that in croup (or tracheal Diphtheria) the false membrane is the essential and pathognomonic feature of the disease; while in laryngitis stridulosa, there is no more false membrane, and no more tendency to exude it, than there is in ordinary acute bronchitis. Tracheal Diphtheria, again, is epidemic and perhaps contagious; laryngitis stridulosa is not epidemic, and not contagious, but is certainly due, at any rate in part, to atmospheric causes, as cold and wet, and is connected with certain constitutional conditions, as, for instance, teething.

Bretonneau, as is well known, strongly urged the identity of tracheal Diphtheria with so-called croup, and most French writers on medicine adopt this view. Guersant, in his article in the "Dictionnaire de Médecine," of 1835, while arguing that croup is not a new disease, points out that nearly all the former descriptions of it are imperfect, owing to the absence of post-mortem examinations; and he shows, as I have indicated, that the affections classed at present under the name of croup, comprise two very

different diseases: namely, one, in which the internal surface of the pharynx, and also of the larynx and trachea, is covered with pseudo-membranous exudations, and another, in which all these parts are simply reddened, or very slightly swollen, and in which no plastic exudation is discovered. He calls the first, membranous or pseudo-membranous pharyngo-laryngitis, or true croup, and to the other he gives the name of laryngitis stridulosa.

Bouchut, in his "*Traité Pratique des Maladies des Nouveaux Nés*," while admitting the similarity of the symptoms of croup, or tracheal Diphtheria, and laryngitis stridulosa, agrees entirely in the opinion given by Bretonneau and Guersant as to the essential difference between them, and he urges the necessity of establishing a precise distinction between the two affections, which require entirely different therapeutical appliances. The following is his diagnosis:—"Stridulous laryngitis is accompanied, like croup, with a dry, hoarse, sibilous, and more or less sonorous cough. The difficulty of breathing is extreme; the child appears as if about to perish of suffocation; still the larynx is free, and there cannot be any expectoration of false membrane. The phenomena observed are purely nervous, they soon subside, and their progress is altogether peculiar. They appear suddenly, and in a very high degree of intensity, in subjects who are otherwise in good health, or slightly affected with cold. They manifest themselves in the middle of the night. The paroxysm lasts about two hours, and is reproduced on the following two or three nights in succession; but it gradually becomes more feeble, and at last disappears. Croup presents nothing like this; for the symptoms increase gradually, and suffocation presents itself only at the end of several days. The fits appear by day as well as by night, and they are reproduced as long as the false membranes inclosed in the larynx are not thrown up. Far from diminishing gradually, the fits become, on the contrary, more alarming every moment, and they terminate by carrying off the patient."

Trousseau, both in his writings and in his practice, adopted entirely the views of Bretonneau as to the identity of croup with tracheal Diphtheria; he considers the formation of the false membrane to be the distinguishing character of the disease, and his most valuable contributions to its treatment are perhaps those relating to the propriety of performing tracheotomy for the removal of the false membrane. He tells us, in an article in the "*Dictionnaire de Médecine*," of 1835, that he had then performed

the operation thirty-six times in cases of croup, and that nine children recovered.

Empis, in his very elaborate and able treatise on *Diphthérite*, in the "*Archives Générales des Médecine*," observes that he has never found any remarkable difference between Diphtheria of the mucous tissues, and that developed on the skin, but he describes croup and Diphtheria of the trachea as synonymous terms. He gives a careful diagnosis between Diphtheria and other affections of the tonsils and soft palate, and of the mouth, but he gives none between croup and Diphtheria, for the best of all reasons, namely, that they are identical.

Rilliet and Barthez, in their "*Traité des Maladies des Enfants*," second edition, published in 1853, draw a clear distinction between croup, or, as they term it, laryngite pseudo-membraneuse, and laryngitis stridulosa, which they term laryngite spasmodique. I do not adopt the names given to these affections by Rilliet and Barthez, because the first is not proved to be an inflammation, and the second is so distinctly inflammatory that the epithet "*spasmodique*" might lead to misconception as to its true nature. But the two affections, which Rilliet and Barthez call respectively laryngite pseudo-membraneuse and laryngite spasmodique, correspond exactly to the two described by other authors as tracheal Diphtheria or croup and laryngitis stridulosa. Strangely enough, MM. Rilliet and Barthez state that in France the two affections are often confounded together, whereas in England they are carefully distinguished; a statement exactly contrary to the fact, for in France the laryngeal affection, attended with the pseudo-membranous exudation, is always referred to Diphtheria, while in England, the tracheal Diphtheria and the laryngitis stridulosa are generally confounded together. Without entering at length into the details of the two affections given by Rilliet and Barthez, it may be stated that while the production of the false membrane is the essential character of the one disease, it is never found in the other.

In English medical writings and among British practitioners, I am aware that the identity of croup with tracheal Diphtheria, on the one hand, and the essential difference between this pseudo-membranous disease and laryngitis stridulosa, on the other, are not yet generally admitted. But if we examine some of the best English medical authorities we shall find, that, while drawing a distinction between pseudo-membranous croup and pseudo-mem-

branous (tracheal) Diphtheria, the authors unconsciously admit their identity, or at any rate fail to point out any real points of difference. In Dr. Copland's well-known Dictionary, a perfect wonder of labour and industry, in the article "Croup," the great medical lexicographer has brought together all that was known of the disease called eroup in England, and all that was known of diphthérite in France; but, as if to show that he did not consider the two diseases as distinct, he makes no mention of "Diphthérite" as a separate affection at all, the heading "Digestive Canal" in the Dictionary being immediately succeeded by the heading "Disease." Now as Dr. Copland was quite aware of, and was conversant with, the literature of Diphthérite, he would have undoubtedly devoted an article to its elucidation if he had considered it to be a distinct disease; and yet we find that all his information concerning diphthérite is comprised in the article "Croup," and in the bibliographical references at the end of that article, the works of Bretonneau and of others of his school are distinctly referred to. On perusing the article itself, it is quite evident that Dr. Copland, while apparently drawing a distinction between eroup and the tracheal diphthérite of Bretonneau, is really describing the same affection, while on the other hand he draws no distinction between the pseudo-membranous affection of the larynx and trachea, and the inflammatory disease without any pseudo-membranous exudation, which is laryngitis stridulosa. But although he does not specifically point out these affections to be distinct, he really indicates that they are so, for he admits that there are very different forms of eroup, the disease producing in one case only simple inflammatory irritation, in another case a thick, viscid, mucous exudation, "and in many, particularly in young animals, a complete false membrane." It is thus obvious that Dr. Copland has got the key to the real nature of the two diseases, (or perhaps three,) which he comprises under one head, and he proceeds in his article to mix up the views and researches of Bretonneau, which distinctly refer to epidemics occurring in France, with the dubious utterances of other writers, ancient and modern, and the more definite clinical experience of very recent days.

Now there can be no doubt that the disease which I term laryngitis stridulosa has always been, and still is, a very common affection in this country; and I think it is very probable that tracheal Diphtheria, or what is called true croup, has also prevailed in this country, although only at intervals, but that its

diphtheritic nature has been misunderstood. Thus the fatal cases, in which the false membrane was found by post-mortem examination, were referred to croup, and the cases which were not fatal, and in which there was no false membrane, were referred likewise to croup; and energetic measures of an antiphlogistic nature were resorted to in cases of tracheal inflammation, in order *to prevent the formation of the false membrane*. I may remark, in passing, that I believe the antiphlogistic treatment of the laryngeal inflammation was perfectly justifiable, although not for the reason assigned; while in cases of laryngeal or tracheal diphth rite, it was entirely unjustifiable, and was generally unsuccessful. Thus then, no doubt, it happened that in the successful cases practitioners believed, that, by the adoption of bleeding and the administration of calomel and tartar emetic, they had arrested the formation of the false membrane; and that in the unsuccessful ones, where the false membrane was actually found, they lamented that they had not carried the antiphlogistic treatment far enough. My opinion now is that they were treating two different diseases; one they cured, as it may be cured now, by antiphlogistic remedies, and the other they did not cure, because it was incurable, at least by the remedies employed.

As an illustration of the misconception into which Dr. Copland appears to have fallen in reference to the distinction I am now endeavouring to draw, he gives, in a note to the article "Croup," a case taken from his own practice. The patient was a child, aged five and a half years, who was seized with all the symptoms usually considered to denote croup, and Dr. Copland prescribed bleeding to the approach of syncope, and afterwards ordered full doses of calomel and tartar emetic. It is unnecessary to pursue the case in its details, further than to observe that, after several vicissitudes, the child eventually recovered completely, but not one word is mentioned of any false membranes being thrown up in the course of the malady, and it is totally contrary to our present experience to suppose that bleeding and calomel would cause the disappearance of these membranes, although the tartar emetic might have induced their expulsion by the mouth. My conclusion, therefore, is that Dr. Copland's case was not one of croup at all—that is to say, if croup is attended by the production of a false membrane—but that it was one of laryngitis stridulosa, and that the treatment was perfectly correct, and, as it turned out successful.

In order, moreover, to prove that the case just referred to was not one of croup, I quote Dr. Copland's own definition of the disease:—"Inflammation of the trachea, sometimes of the larynx and trachea, *occasioning albuminous and membranous exudation.*"

In another very able, but more recent work, on the Practice of Medicine, namely, Dr. Austin Flint's treatise on that subject, published in 1868, it seems to me that a similar mistake is discernible. On turning to the article, "Laryngitis with Exudation of Lymph," Dr. Flint states that this affection occurs for the most part in children, and is commonly known as true croup. He goes on to say that "*the laryngitis is essentially the same in diphtheria and in the affection called croup, yet, taking other circumstances into account, diphtheria and croup are quite different diseases.*" But on looking through the rest of the article, Dr. Flint has not specified any of the "other circumstances," and on the contrary he entirely agrees with the views which I have expressed. Under the head "Diagnosis" it might be expected that the distinctions between croup and Diphtheria would be specified, but so far is this from being the case that Dr. Flint proves croup and Diphtheria (of the larynx) to be the same disease. Those who advocate the identity of the two rely upon the fact that the diphtheritic exudation occurs first upon the fauces, and Dr. Flint quotes Dr. Ware, as showing that "out of thirty-three cases of true croup, *i.e.* laryngitis with exudation, a pharyngeal exudation was observed, *in all save a single case.*" On the other hand, "of forty-five cases of the affection included under the head of false croup, an exudation within the pharynx was sought for, and found wanting in every case." Dr. Flint is so emphatic in explaining that the false membrane is the essential character of true croup, that he tells us, that, "in the progress of the disease, if it do not destroy life, the discovery of patches of false membrane in the matters expectorated should be considered as the only reliable test of the correctness of the diagnosis." This is precisely what I advance; and this is the reason why I do not consider Dr. Copland's case just quoted to be one of croup. Now on turning to the article "Diphtheria," in Dr. Flint's treatise, we might expect to find the differences pointed out between that disease and croup, but on the contrary we are told that the chief danger of diphtheria consists in the extension of the disease into the larynx;" and he then continues, "*the disease involves the morbid conditions which exist in true or diphtheritic croup.*" Dr. Flint therefore sets out by

declaring that croup and laryngeal Diphtheria are quite different diseases, and then goes on to prove that they are the same.

If we regard croup and laryngeal Diphtheria as being one and the same affection, there are still some diseases or conditions which are allied to it; and prominently among them stands of course the laryngitis stridulosa, which has now been sufficiently referred to, and which is a dangerous affection, though it is not so dangerous in itself, and is more amenable to treatment than, laryngeal Diphtheria, and chiefly because the great source of danger, namely, the pseudo-membranous exudation, is absent. But besides laryngitis stridulosa, which appears to be specially a disease of childhood, there is also the ordinary form of laryngitis, which is common enough in adult life, and which may be called Laryngitis Acuta Simplex. But this affection is not accompanied by stridulous breathing, and it is almost unnecessary to point out the circumstances in which it differs from croup, because the mistake has never been made. Still less is it necessary to specify the distinctions between croup and chronic laryngitis, the diagnosis of the latter being very easy. But Dr. Copland has committed a very grave error in describing the Laryngismus Stridulus of Good under the head of Croup, with which it is in no way connected, except in the accidental circumstance of the stridulous breathing which is common to both affections. Laryngismus stridulus (which I need hardly state is to be carefully distinguished from laryngitis stridulosa) is not an inflammation at all in any sense of the word, and is never attended by the formation of any false membrane, thus being clearly distinguished from both laryngeal Diphtheria and laryngitis stridulosa. Laryngismus stridulus is in fact a mere spasmodic closure of the glottis, caused by reflex action operating on the adductors of the vocal cords; no pathological local lesion can be detected; and an error in diagnosis as to its real nature might lead to very serious errors in practice.

As a summary of the remarks and arguments I have adduced in the above paper I would beg to draw the following general conclusions.

(1) That Diphtheria is characterised essentially by the presence of a peculiar false membrane, deposited in successive layers, and possessed of such tenacity that it may be removed in strips, leaving the subjacent tissue swollen but entire.

(2) That the seat of Diphtheria is most commonly on the posterior part of the fauces, and that it first appears in this region, but that

it may extend to the nose, to the œsophagus, to the larynx, to the Eustachian tubes, to the trachea, and even to the bronchial tubes.

(3) That Diphtheria may be developed on the skin when any abrasion of the surface has taken place, as upon blistered portions of the skin.

(4) That Diphtheria may be distinguished according to its seat as tonsillar, nasal, œsophageal, laryngeal and tracheal, Eustachian, and cutaneous.

(5) That laryngeal and tracheal Diphtheria are the same affection as that usually described as croup.

(6) That the word Croup, as having no meaning, and as comprising at present (see Dr. Copland's Dictionary) such widely different diseases or affections as Tracheal and Laryngeal Diphtheria, Laryngitis Stridulosa, and Laryngismus Stridulus, ought to be abolished in medical nomenclature, and that the three terms just mentioned should be substituted.

(7) That Diphtheria generally occurs in an epidemic form and is probably contagious, while laryngitis stridulosa and laryngismus stridulus are not epidemic, are not contagious, and depend upon either climatic and local influences, or upon idiopathic and constitutional conditions.

(8) That the inflammatory character of Diphtheria is not proved, but that laryngitis stridulosa is undoubtedly an inflammation, and that laryngismus stridulus is only a spasm.

(9) That the local affections of the mouth and fauces most likely to be mistaken for Diphtheria are muguet or aphthæ, the false membrane of scarlatina, and follicular inflammation of the tonsils, and that this mistake has perhaps often occurred.

(10) That Diphtheria is not a new disease, and that many cases classed formerly under the head of croup have really been instances of Diphtheria.

(11) That, in reference to treatment, it is essential to form a correct diagnosis of Diphtheria, a disease which is epidemic, but is local in one of its chief manifestations, and constitutional in its effects on the system. That the indications of treatment should be to prevent, if possible, the extension of the false membrane, to support the strength of the constitution, and to promote the removal of the false membrane from the respiratory passages, if the disease has attacked them. That in laryngitis stridulosa the treatment should be antiphlogistic, and should include the use of tartar

emetic or ipecacuanha, or even the application of leeches ; and that in laryngismus stridulus the cure should be sought by the use of those remedial measures which correct the morbid affections by which the laryngeal spasm is induced.

THERAPEUTIC MEMORANDA.

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CHLORAL HYDRATE [$C_2HCl_3O_2 + Aq.$]

So much has been written in praise of this remedy, that it seems only fair to give publicity to some cases of failure. The mode of administration employed has been to give the drug by itself, or only mixed with a little syrup or orange-flower water to disguise its taste. I have given it in five cases of phthisis as a sedative and hypnotic, with the unpleasant effect of inducing acute delirium in three of the cases, and that on more than one occasion. The two other cases derived less benefit than accrued from the use of opiates. It is possible that the failure in all these cases was due to the dose (thirty grains) being too small, as I found in experiments on myself that seventy to eighty grains were required to procure sleep. Such doses had the effect of lowering my previously normal temperature as much as 1.1 to 1.6 centigrade (2 to 3 degrees Fahrenheit); due allowance being made for daily fluctuations.

I have notes of twenty-two cases of whooping cough, in which I have given the hydrate of chloral to relieve the cough, after the whooping stage was fairly reached. Of these, twelve males and six females were under three years of age, and two males and two females were above three years, and under the age of seven. The dose was from five to ten grains, according to age, repeated every three, four, or six hours, according to the severity of the cough. Of only three could it be said that any appreciable benefit was derived from the drug, and one of these ultimately succumbed to the disease.

The remaining nineteen, after from fourteen to twenty-one days' use of the chloral were in no way benefited, and the medication was

therefore changed. I have given it in some fifty cases of the same complaint, but only those mentioned remained under observation long enough to warrant me in recording them.

A rather severe attack of purpura occurred in a little girl aged two and a half years, after ten days' use of the chloral. She had taken about three hundred grains in that time. In another girl, aged six years, ulcers of the cornea were observed seven days after using the drug. She had taken about two hundred and fifty grains. Another girl, aged three years, had ulcers of the tongue of a rather severe kind, not apparently syphilitic, after taking only one hundred and sixty grains. I cannot be sure that these results were due to the chloral, and only name them because Dr. Down informs me that he has seen boils and carbuncular affections supervene on its use. In connection with this fact, it may be interesting to mention that I have established the induction of a temporary glycosuria after taking the hydrate of chloral, in a case where there was no known disease, as well as in many cases where there was previously no appreciable amount of sugar in the urine before taking it.

iodoform [CHI_3].

The late Dr. Eastlake drew attention to the sedative and anodyne properties of this preparation at a meeting of the Obstetrical Society in January 1866 (Obstet. Soc. Transactions, Vol. VIII. pp. 8—10.) At that meeting Dr. Greenhalgh also bore testimony to its beneficial effects in relieving the pain of cancer. I had never before given it myself, although some seven years previously I had seen it prescribed by the late Dr. Beck, (formerly Physician to the Palatinate of Hungary,) and I think by both Dr. Joseph and Dr. William Bullar, then practising in Southampton, but since deceased. After hearing Dr. Eastlake's paper, I immediately prepared some by heating water, bicarbonate of soda, and rectified spirit, and throwing in iodine as long as the mixture was decolorised. If this process be followed, care must be taken to avoid excessive heat, as the iodoform is very volatile. I tried it at once in the wards of the London Hospital, with the consent of the then physicians, in several cases of cancer, neuralgia, and other severe pains. In all about twenty patients took the drug. I gave it in five, ten, and twenty-grain doses, according to the pain, simply stirred up in water. Beyond nausea in one or two cases, no unpleasant effects were noted, but all derived very great temporary relief from their pain. I intend to make further trials of this

medicine, and shall give it in pills to avoid the unpleasant taste. All the patients were adults, and suffering very severe pain. I think, in any fresh trial it would be advisable to give five-grain doses at first, until one is sure that the medicine is tolerated. I think it well deserves a trial in tertiary syphilis, particularly in periosteal rheumatism and syphilitic ulcers. I have certainly seen cases in parish practice, where more good seemed to be derived from taking a mixture of liquor potassæ and tincture of iodine, in which combination a small quantity of iodoform is produced, than from taking simply iodide of potassium.

CALCIUM SULPHO-CARBOLATE $[\text{Ca}(\text{C}_6\text{H}_5)\text{SO}_4 + \text{Aq} ?]$.

At the North-Eastern Hospital for Children I have given this new remedy—first introduced to the profession by my friend and colleague, Dr. Sansom—in eighty-eight cases of rickets, most of which were severe cases. There were fifty-two males and thirty-six females. Of these, there were twenty-nine less than twelve months of age, eighteen males and eleven females; and of these, four males and one female died. There were thirty-three cases, nineteen males and fourteen females, under two years of age; and of these, one female died. Twenty-six cases, fifteen males and eleven females, were more than two years of age, and of these none died. To show the severity of the cases, I may mention that seven had also unmistakeable signs of inherited syphilis, and five of tubercle. In ten cases, the rachitic marasmus was extreme, and fifteen of them had severe diarrhœa. There were two cases complicated with albuminuria and epistaxis, two had meningitis, and five had repeated attacks of convulsions. One case had jaundice, another had ague, and in five there was unusually severe bronchitis. Many had eczema and lichen in different forms. Notwithstanding the severe character of most of the cases, remarkable and striking results—rapid gain in weight, improvement in general health and strength, and abatement of rachitic symptoms—were observed in fifteen cases. Thirty-eight others were very considerably improved by the use of the remedy, six cases died as before mentioned, and twenty-nine either ceased attending or failed to show any beneficial effects from the treatment. It thus appears that nearly five-eighths of the cases improved while taking this medicine. I may remark that it was given by itself, only dissolved in water, and in doses of two and a half to five grains, according to age. In no case were any bad results noted. It was suspended in a few of the twenty-

nine cases marked as failures, on account of diarrhœa, which it does not seem to possess any power of checking. In future, however, I intend to combine it with opiates in such cases, so as to continue the general treatment in spite of the complication.

CALOMEL AS A VERMIFUGE.

The use of calomel in doses of five to ten grains, according to age, simply placed upon the tongue, is almost invariably followed by the expulsion of lumbrici and ascarides, when these are present. I could give a great many cases of the former being expelled by this treatment. When I suspect ascarides, however, I prefer to combine santonin, or to administer enemata of salt and water, or of perchloride of iron solution.

ALUM IN PERTUSSIS.

Of all the remedies used for hooping-cough in the chronic stage, alum has proved most useful in my hands. It should be given in doses of one to two grains for each year of age, every three or four hours. The cases benefited are too numerous to tabulate.

KAMALA AS A VERMIFUGE.

I have found the tincture perfectly useless for tæniæ, whereas the powder, when genuine, has, in half-drachm to one-drachm doses, been pretty uniformly successful in causing the expulsion of both tæniæ and bothriocephali.

QUININE AS AN ANTIPERIODIC.

The most economical way of using quinine is to give from ten grains to half a drachm; or, in very bad cases, two scruples at once, and then to continue smaller doses, or to give Fowler's Solution of Arsenic, or this and quinine also, *till the thermometer indicates the entire absence of pyrexia.*

OLEUM TEREBINTHINÆ AS A VERMIFUGE.

This is one of the most efficacious vermifuges we have. It is, however, occasionally very disagreeable in its after effects. Ardor urinæ, strangury hæmaturia, tenesmus, vomiting and diarrhœa, or narcotism, one or all occasionally resulting from its use. I have, however, never seen any really dangerous result, and the unpleasantness (except narcotism) generally followed small doses, such as a fluid drachm.

OPIUM IN ENTERIC FEVER (ABDOMINAL TYPHUS).

I have treated over one hundred cases of this fever solely by opiates, (small doses of tincture of opium,) unless diarrhœa or sleeplessness appeared to require larger doses, with the gratifying result of only two deaths. As, however, I propose giving some details of this treatment in a special paper on some future occasion, I forbear encumbering this with any further account of the cases; simply adding that the general results of this treatment are very pleasing, and that it appears also to be an excellent method of treating acute pneumonia, as recommended by Dr. Austin Flint, of the United States.

LIQUOR CALCIS SACCHARATUS.

I have been much pleased with the result of employing this preparation in cases of rickets and the acid dyspepsia of infants and young children. It combines well with cod liver oil, and makes it more palatable to children.

SYRUP OF IODIDE OF IRON.

There seems to be a sort of fashion of giving drachm-doses of this drug in cases of rickets, struma, congenital syphilis, and tuberculosis, almost irrespective of age or particular cases. I am sure that this large dose is not well borne by many stomachs, in cases where a smaller dose would probably do great good. This fashion seems parallel with that of giving a couple of drachms of *virum ferri*, or five minims of Fowler's Solution, to all sorts of ages and cases,—a practice which used to excite my wonder even when an apprentice. A combination of the ammonio-citrate of iron with iodide of potassium, which produces some iodide of iron, agrees better with some delicate children than the official syrup of the iodide of iron.

IODIDE OF POTASSIUM.

The old adage, "that the best tonic is the right medicine for the case," is strikingly shown by the effects of this drug in cases of syphilitic deposit in the lungs. Not long ago, I saw a case of a bricklayer, in whom phthisis was diagnosed from both general symptoms and physical signs. He had lost a stone in weight the week before, in spite of taking cod liver oil and a large amount of nutritious material. The iodide of potassium was given in five-grain doses. Within a month of taking the iodide he was, to all appearance, perfectly cured, and in six weeks had regained his original

weight before the illness commenced.* Instances of the truth of this old saying might be adduced in great numbers, if necessary, from notes of cases of chlorosis and anæmia, treated by *aloes* instead of *iron*.

ARSENIC (FOWLER'S SOLUTION) IN CHOREA.

I suppose it to be impossible to arrive at the average natural duration of cases of chorea—excluding the acute cases immediately supervening on acute rheumatism—from the data at present in our possession. An approximation may, however, be made, by adding together the duration of all published cases, under all kinds of treatment, and if this be done, and the average under all kinds, excluding the arsenical, be set against the average duration when treated by arsenic, I think it will be found that the arsenical treatment gives the shortest period. This is certain, that the general health of the little patients is greatly improved whilst using this drug.

SANTONIN AS A VERMIFUGE.

In doses of a grain for every year of age, I have given this drug to, at least, one hundred children, without any worse consequences than a little temporary delirium, of very mild character, in one or two cases, and nausea or vomiting in three or four. When pure, I believe it to be perfectly safe in such doses, and it has one great advantage—it is efficacious against all kinds of worms, even *tæniæ*. Another advantage is that, if we get the next urine passed by the little patient, we can make sure that the dose has been taken, because, as is well known, the santonin colours the urine orange; on the addition of an alkali—soda, potash, or ammonia—the colour is changed to blood-red, and this reddened solution cuts off nearly all the blue end of the spectrum.

PERCHLORIDE OF IRON.

I have a strong suspicion that this drug is decidedly anti-syphilitic, and deserves to rank next to mercurials and iodides in the treatment of various stages of specific disease. I am, however, collecting details on this point, and merely throw this out as a suggestion. It certainly seems to check cell-proliferation in cases of suppurative cachexia, such as scarlatinal buboes, &c.

* See also Dr. Duffin's cases, and the Report of the Committee on Syphilitic Temperature, in the Transactions of the Clinical Society, and also the cases mentioned in the article "Syphilis" in Wunderlich on Temperature, New Sydenham Society's translation.

HYDROCHLORATE OF MORPHIA (HYPODERMICALLY).

I can fully confirm the published statements of Mr. Hunter, Dr. Andrew Wood, Dr. Lawson Tait, and others, as to the rapid relief and frequent cure of sciatica by this method of treatment. I wish, however, to call special attention to the relief, usually lasting twenty-four hours, it affords to the troublesome vomiting of advanced pregnancy, where this depends upon disease of the cervix uteri, whether cancerous or syphilitic. These are well known to be most troublesome cases, and unless we are certain of the death of the foetus, I strongly recommend this plan, which I have tested, in preference to the induction of premature labour.

BRAIN EXHAUSTION.

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ASYLUM.

THE title which stands at the head of this paper has reference to a class of cases which are constantly occurring in the practice of everyone of us, and respecting our diagnosis, prognosis, and treatment of which there exists a good deal of difficulty, quite equal to their importance.

It is no unusual circumstance to meet with cases of mental unsoundness without delusion, in which there is a simple suspension, or apparent loss, of mental power, and in which the gravest issues are concerned in the enquiry as to whether such unsoundness is dependent upon changes in the circulation and nutrition of the brain of a temporary and remediable character, or evidence of Dementia, associated with, and caused by, serious organic cerebral disease. Such cases bring with them the most weighty responsibility to the medical attendant, and are frequently causative of the greatest embarrassment; for which reasons, I have ventured to hope that a brief paper upon brain exhaustion, as embodying that which I believe to be the originating principle of many such cases, may not be altogether either uninteresting or unacceptable.

In commencing this enquiry it will, I think, be at all events convenient that I should endeavour to illustrate the extreme delicacy of structure, and consequent liability to disorder, of the brain, and the great importance of its healthy circulation, by a somewhat detailed reference to recent researches into its minute anatomy and the measure and completeness of its blood supply.

The brain consists of a mass of nerve cells, imbedded in a sort of connective tissue, and arranged in a peculiar manner. According to the recent researches of Dr. Lockhart Clark, "most of the convolutions, when properly examined, may be seen to consist of at least seven distinct and concentric layers of nervous substance, which are alternatively paler and darker from the circumference to the centre. The laminated structure is most strongly marked at the

extremity of the posterior lobe. In this situation all the nerve cells are small, but differ considerably in shape, and are usually more abundant in some layers than others. In the superficial layer, which is pale, they are round, oval, fusiform, and angular, but not numerous. The second and darker layer is densely crowded with cells of a similar kind, in company with others which are pyramidal and pyriform, and which lie with their tapering ends either towards the surface or parallel with it, in connection with fibres which run in corresponding directions. The broader ends of the pyramidal cells give off two, three, four, or more processes, which run partly toward the central white axis of the convolution, and, in part, horizontally along the plane of the layer, to be continuous, like those at the opposite ends of the cells, with nerve fibres running in different directions. The third layer is of a much paler colour. It is crossed, however, at right angles by narrow and elongated groups of small cells and nuclei of the same general appearance as those of the preceding layer. These groups are separated from each other by bundles of fibres, radiating toward the surface from the central white axis of the convolution, and together with them forming a beautiful fan-like structure. The fourth layer also contains elongated groups of small cells and nuclei, radiating at right angles to its plane; but the groups are broader, more regular, and, together with the bundle of fibres between them, present a more distinctly fan-like arrangement. The fifth layer is again paler, and somewhat white. It contains, however, cells and nuclei which have a general resemblance to those of the preceding layers, but exhibit only a faintly radiating arrangement. The sixth and most internal layer is reddish-grey. It not only abounds with cells like those already described, but contains others that are rather larger. It is only here and there that the cells are collected into elongated groups which give the appearance of radiations. On its under side it gradually blends with the central white axis of the convolution, into which its cells are scattered for some distance. The seventh layer is this central white stem or axis of the convolution. On every side it gives off bundles of fibres, which diverge in all directions and in a fan-like manner towards the surface, through the several grey layers. As they pass between the elongated and radiating groups of cells in the inner grey layers, some of them become continuous with the processes of the cells in the same section or plane, but others bend round and run horizontally, both in a transverse and longitudinal direction (in reference to the course

of the entire convolution), and with various degrees of obliquity. While the bundles themselves are by this means reduced in size, their component fibres become finer in proportion as they traverse the layers toward the surface, in consequence, apparently, of giving off branches to be connected with cells in their course. Those which reach the outer grey layer are reduced to the finest dimensions, and form a close network, with which the nuclei and cells are in connection. Besides these fibres, which diverge from the central white axis of the convolution, another set, springing from the same source, converge, or rather curve inward, from opposite sides, to form arches along some of the grey layers. These arciform fibres run in different planes, transversely, obliquely, and longitudinally, and appear to be partly continuous with those of the divergent set, which bend round, as already stated, to follow a similar course. All these fibres establish an infinite number of communications in every direction, between different parts of each convolution, between different convolutions, and between these and the central white substance."

The blood supply of the brain is most profuse, amounting, according to Haller, to as much as one-fifth of the whole mass within the body. The way in which it is conveyed and distributed to the brain is peculiar, and I hope I may be excused if I venture to recall it to the recollection of my readers. The arteries supplying the brain are four in number—the two internal carotids, and the two vertebrals coming from the subclavian, and uniting to form the single basilar, which again divides into the two posterior cerebrals. The carotids give off the posterior communicating and the middle and anterior cerebral, from the latter of which springs the anterior communicating artery, to complete the circle of Willis. Speaking broadly, the whole posterior portion of the brain is supplied by the vertebrals, while the anterior part of it receives its blood supply from the carotids. The grey matter of the hemispheres is supplied with blood entirely from the pia mater, which sends down innumerable small vessels into its substance. Here they inosculate freely, and then pass into fine veins, which again return to the pia mater, and unite into larger branches.

As Dr. Blandford has observed, free anastomosis evidently does not exist between the vessels supplying the anterior and posterior parts of the brain. This fact is shown by the results of operations upon the carotids, and Van der Kolk, in his recently published work in mental diseases, quotes the observation of Parry, "that so

powerful is the influence over the cerebral circulation of compression of the carotids, that he had been able to check a maniacal paroxysm in an insane patient by this simple process alone."

The arterics of the brain "have great facilities for rapid contraction and dilatation after they have once passed through the bony canals by which they enter the cranium. The internal carotids pass through the cavernous sinus, and are protected from pressure by the blood there, and then, like the vertebrals and basilar, they are surrounded by the sub-arachnoid fluid at the base of the brain; and the vessels of the pia mater have facilities for contraction and dilatation, which they could not have were they embedded in the interior of the organ." This contraction and dilatation are, as we know, under the control of the vasomotor system of nerves, which accompany the arterial trunks and branches to their entrance into the pia mater.

"In the grey cerebral substance the smaller branches and capillaries are without nerves, and so it needs must be that the contraction and dilatation of these vessels must depend on that of others, and on causes external to the grey substance. It depends, in fact, upon the influence of the vasomotor nerves, which is derived from the special nerve centre whence they emanate; those which accompany the internal carotid and its branches being derived from the first cervical ganglion; those which belong to the vertebro-basilar system, from the second and third cervical ganglion." *

And here I may be permitted to express my conviction, that, in the fertile field of the connection between the sympathetic nervous system and the circulation within the brain, will be ultimately found that which will repay investigation, in reference especially to cases of temporary insanity having apparently a physical and eccentric origin. As Van der Kolk has suggested, "we prove this influential connection vividly after every indigestion; even after each meal we are less inclined for mental exercise. If the appetite fails, and digestion is impaired, then we feel indolent, unstrung, and depressed. While conversely, in sorrowfulness and mental suffering we have a feeling of languor and depression, a weight in the limbs, the digestion suffers, the pulse is slow, and the blood flows less easily through the lungs. With the sluggish circulation, the blood in the brain is not duly renewed, and the brain, therefore, lacks its due and healthy stimulation."

* Blandford. "Insanity and its Treatment."

We have thus seen that not only is the minute constitution of the brain elaborately complex and delicate, but also that the blood supply is secured to the amplest possible extent, and in a manner which itself announces its grave importance. Healthy cells and a liberal supply of healthy blood are essential for the due discharge of those operations which, in their combination, we call mind; of whose existence we can form no idea save by means of the material organism which, if it does not originate it, at all events acts as the medium whereby it is brought into communication with surrounding matter. If from any cause the minute cells of which the grey matter of the brain is made up become impaired in their nutrition, and consequent power of healthy action; if in any manner the supply of blood becomes altered, except within certain limits, or the quality of such supply becomes depraved or defective; then we at once see the effects, in the manifestation of impaired action; in those phenomena which we recognise as mental unsoundness, not necessarily that sort or degree of insanity which makes it requisite to shut up its subject in a lunatic asylum, but still a departure from health, a negation of mental soundness in its strictest sense. Thus we arrive at a primary basis on which to found a system of cerebral pathology, and from this we may deduce the corollary, which I cannot express better than in the words of Dr. Bucknill, that "mental health is dependent upon the due nutrition, stimulation, and repose of the brain; that is, upon the conditions of the exhaustion and reparation of its nerve substance being maintained in a healthy and regular state; and that mental disease results from the interruption or disturbance of these conditions." The supply of blood need not, of course, necessarily be deficient either in quantity or quality in order that this result should follow. It may be in excess, and so induce the evils which result from abnormal pressure, congestion and consequent failure of nutrition, or active hyperæmia, approaching to or even reaching true inflammation. My object, however, on the present occasion, is to draw attention to those cases which arise from the opposite of these conditions—from brain exhaustion, the result of anæmia or of defective nutritive properties in the blood. As before observed, in order that the mental processes should be carried on with vigour and activity, it is essential that the organ of the mind should receive its normal supply of healthy blood, by the instrumentality of which metamorphosis of tissue may be regularly secured. If, however, this element is wanting, important changes occur in the nutrition of the brain, and

a partial arrest of its functions ensues; precisely as when, from want of use or other cause, the circulation in and nutrition of a muscle becomes impaired, and its function in some degree suspended.

It has been shown by Donders, and also by Kusmaul and Tenner, who inspected the brains of rabbits under a variety of conditions by means of a glass plate fixed into the skull, and secured so as to prevent the access of air, that excessive arterial tension from any cause produces venous and arterial anæmia of the brain and disturbance of its functions, and in this way many persons explain the occurrence of epilepsy by means of primary irritation of the sympathetic, causing the vasomotor nerves to increase arterial tension, and so produce sudden cerebral anæmia. Again, experiments by Mr. Durham and Dr. Hughlings Jackson have shown that the phenomena of sleep, wherein is a more or less perfect suspension of mental operations, are probably due to a diminution of blood within the brain, and of the nutritive processes which its presence there would imply.

Mr. Durham having administered chloroform to a dog, removed a portion of the skull and exposed the brain, which appeared vascular, tense, and prominent. When the action of the chloroform had passed off, what appeared to be natural sound sleep supervened, and the surface of the brain became pale, and sank somewhat below the level of the bone, the veins lost the distention which had previously characterised them, and the general vascularity of the brain appeared to subside. When the sleep was disturbed, the turgidity of the vessels again appeared, and the more perfect became the condition of wakefulness, the more vascular became the surface of the exposed brain. The animal was now fed, and soon afterwards sank into quiet sleep. Once more the same phenomena presented themselves. The surface became pale and the vessels contracted, while the whole mass of brain occupied less space, as evidenced by its shrinking from the bony margins of the opening. The trials were several times repeated upon different animals with precisely similar results. The inference drawn from these experiments was corroborated by Dr. Hughlings Jackson, who made an ophthalmoscopic examination of the retina during sleep, and found that the optic disc was whiter, the arteries smaller, the veins somewhat larger, and the neighbouring part of the retina more anæmic than in the waking state. Moreover, some remedies seem to induce sleep by producing upon the brain a similar effect. Thus, as Dr. Bland-

ford suggests, hydrate of chloral probably renders the brain more anæmic by increasing arterial tension, which the sphygmographic tracing shows it has power to do.

It thus, I think, becomes evident that upon anæmic exhaustion of brain depend phenomena which are imitated by the earlier stages of mental disease; and I am, therefore, justified in assuming that these conditions are identical or similar as respects the proximate cause which produces them. Trousseau has brought forward what appears to be conclusive evidence, that the attacks which were known as those of apoplectiform cerebral congestion, in which apoplectic symptoms, of a transient character only, were observed,—the patient falling suddenly to the ground and becoming insensible, but recovering in a few minutes or from that to an hour, and having a certain amount of lethargy and confusion left, but being perfectly well the next day,—are really not cases of active congestion at all, but depend upon anæmia of the brain, and are consequently nearly allied to ordinary syncope. Where the anæmia is not suddenly induced, but results from causes operating over a length of time, no such sudden attack supervenes, but the brain refuses to do its work, and becomes feeble and irritable, and incapable of exertion. Active thought becomes impossible; and, indeed, thought of any kind is irksome and painful. Moreover, as the quantity of the blood supplied to the brain has become diminished, its quality has also deteriorated, and, in turn, influenced the nutrition of the brain. This is just the time and condition in which medical assistance may be so invaluable, and in which it is of the greatest importance that a correct diagnosis should be made, for unfortunately the brain differs essentially in its power of self-protection from any other organ of the body. The stomach indicates its derangement by loss of appetite, and the consequent abstinence from food enables it to recover its lost powers; so, too, the heart endeavours to overcome any obstruction to the distribution of its blood to the system by increasing its muscular power and propulsive force. But the brain can do no such thing. Sleep, its ordinary and natural restorative, is too often unattainable when its services are most required, and so the evil becomes intensified by the absence or diminution of this normal safeguard. Moreover, the same effect upon the nutrition of the brain is probably produced by passive congestion as by positive anæmia. There is the same loss of interchange between the blood and the brain cells, in consequence of the stasis which is present; and sleep, which is just as urgently needed, just as abso-

lutely refuses to lend its aid. Again, we have the fullest evidence of the influence which the presence in the blood of foreign or deleterious matters, or of its normal constituents in excess, exercises over the functions of the brain. A bilious attack, or even the minor bilious condition in which persons of that temperament so frequently pass much of their existence, the effects of alcohol, the presence in the blood of uric acid or oxalate of lime, all give evidence, of a positive and unmistakeable kind, that the circulation within the vessels of the brain of the substances referred to, cannot take place without causing more or less of mental unsoundness; that is to say, greater or less deviation from the perfect working of the instrument upon which the manifestations of mind depend.

Too much can scarcely be said as to the extreme importance of recognising and treating brain exhaustion at an early period. A small delay, and treatment may be able to do little to prevent the supervention of more serious changes in the cerebral mass. Deficiency in the supply of nutritive blood rapidly causes white softening; Dr. Handfield Jones says in about five days. Usually, however, for weeks or months prior to the probability of this occurrence, there have been symptoms which should have excited our attention, and which demanded our interference. The patient has been over-worked as to his mental, possibly also as to his physical, powers. Either the circumstances of his occupation have laid abnormal stress upon his brain, or he has been placed in conditions for which he was ill-prepared or altogether unsuitable. I believe no more fertile source of this brain exhaustion exists than in the latter of these cases. The constant work to be done, and the constant inability to do it, cause an amount of mental strain which cannot be exercised for long at a time without producing serious effects upon the circulation in and nutrition of the brain.

Again, physical causes leading to cerebral exhaustion may have been the exciting agency. Thus sexual excess, the debilitating influence of severe disease, or long-continued intemperance, would all produce alterations in the nutrition of the brain with symptoms of exhaustion therein.

The first well-marked indication which usually presents itself in these cases is a failure in the faculty of attention, and a consequent loss of memory and mental concentrativeness. The patient finds himself to be unable to fix his attention for long together upon any one subject; he cannot read or pursue a train of thought with anything like persistency or advantage. There is a dis-

cursiveness of mind—a weariness which appears to prevent his applying himself continuously to the same pursuit for long together—and so he wanders off from one occupation to another, touching each, but effecting no useful work in any. The patient is usually fully conscious of his mental inaptitude, and struggles to overcome it by strenuous exertions to fix his attention; but all such efforts are vain, and volition ultimately becomes affected to an extent which renders the will practically inoperative. If this state of things be permitted to continue without the intervention of proper treatment, confirmed dementia or well-marked softening of the brain may ensue. Indeed, in many cases which ultimately recover completely, symptoms closely approaching those which indicate these conditions, are not unfrequently met with, giving rise to the gravest apprehensions on the part both of the medical attendant and friends.

Even Griesinger admits that the diagnosis between such states and that which forms the subject of this paper, although always most important, is frequently extremely difficult, and sometimes even cannot be made. The reason of this last fact probably being that the functional disturbance has, as I have before observed, a tendency, if unchecked, to pass into the more serious condition of organic disease. Occasionally the most formidable symptoms give place, under proper treatment, to recovery as perfect as in milder cases, as the following instance, recorded by Dr. Domett Stone, shows.

“The patient was a young man, aged twenty-six, who was supposed to be suffering from general paralysis, the result of mental overwork, deficient food, and excessive masturbation. The attack commenced by an epileptic fit, and was succeeded by the mania grande which is so characteristic of general paralysis, while in twelve days his speech became difficult, his tongue tremulous, and his gait unsteady. He was partly persuaded, and partly compelled to give up his habit of onanism, and was treated with cod liver oil and tonics; and by absolute rest of brain, in less than nine weeks from the commencement of the attack, perfect recovery ensued.” Here was a case in which, doubtless, although many of the symptoms of general paralysis were present, the patient was suffering from brain exhaustion simply, and in which proper measures rapidly secured his restoration to health; and it is not unusual to meet with cases in which such symptoms exhibit themselves, and yet recovery takes place. A gentleman of the middle age, engaged in an

occupation requiring great continuous mental effort, is placed in some difficulty by the non-success of the concern for which he is responsible, but over which he has not absolute control. He feels his inability to cope with his difficulties, but failure would be ruin, and he over-exerts himself in the struggle. He is suddenly prostrated and compelled to desist; his power of attention becomes weakened, his memory fails, he is incapable of rapid mental combination, and his ideas flow with so little readiness and continuity that his speech is slow and hesitating, and he occasionally suffers what may be termed a paralysis of thought, in which he feels his inability to continue the mental process in its proper course. Here are signs which might readily be taken to indicate incipient softening, and yet what is the result? Tonics, more or less decided stimulants, nutritious food, and above all absolute rest of long duration, have not only arrested further morbid change, but secured complete restoration of health.

A clergyman, the son of persons in a humble sphere of life, is educated as a schoolmaster and succeeds in his vocation. Becoming at length more ambitious, he is enabled by means of his own savings and the assistance of friends to go to college, where he works incessantly, and takes high honours. He then goes into a curacy, and there has to exert himself not merely in his professional capacity, but socially in a class to which he has hitherto been unaccustomed. There is, moreover, more than a suspicion of onanism. What wonder that he breaks down, and becomes almost fatuous! He is dreamy, apathetic, and apparently utterly exhausted. His pulse is quick and feeble, his tongue pale and tremulous, the pupils dilated, the conjunctiva pale, the skin relaxed and the complexion pale. He speaks scarcely at all, but when questioned answers very slowly and after considerable pause. There is evidently extreme slowness of the mental processes. Absolute mental rest is enforced, a liberal diet is adopted, sleep is first of all procured by sedatives, and then tonics are administered and regular exercise enjoined. In four months this patient is recovered; and it was an interesting study to note from week to week the gradual improvement, as evidenced in the increase of ability to pursue a train of thought and to express ideas in coherent and well-chosen language. It was, indeed, a new mental birth.

A young lady, aged twenty, has been gradually failing in health for some little time. With the failure of her bodily health she becomes despondent in mind. Suddenly an attack of excitement

succeeds this condition, and then as rapidly subsides, leaving her more feeble than ever, both in mind and body. Her face is pale and anæmic, her tongue pale and tremulous, eyes vacant and staring, pupils dilated and acting sluggishly, conjunctiva pale, head cool, pulse 110 feeble and irritable, skin cool. She is dull, dreamy, apathetic, abstracted; cannot be induced to speak, but sits in one position, staring into vacancy; has an occasional paroxysm, in which she manifests semi-hysterical symptoms. Beef-tea and brandy are freely administered, and an aperient is given at night, replaced by a moderate dose of Morphia after the action of the bowels. Tonics are cautiously given, and regular food and exercise secured. In four months she is perfectly well, and now, after the lapse of five years, she remains so.

When only the ordinary symptoms of cerebral exhaustion present themselves, the diagnosis may be made with considerable certainty. Thus, if there is physical debility, as evidenced by a feeble pulse, pale face, uninjected conjunctiva, and cool head, associated with either simple sluggishness of the mental processes, and an abstracted condition in which there is only a desire to dream away time, with an indisposition to mental exertion of any kind, or where the cerebral exhaustion is manifested by irritability and excitement, we shall have no difficulty in assigning the cases to their proper position. We have here very much the condition which Abercrombie described so many years since, as occurring in the early or milder stages of fever, and is there due both to an anæmic and spanæmic condition of the blood circulating through the brain.

The prognosis of brain exhaustion may be inferred from the observations already made and the cases related. If we see the case early, and there is no special evidence of organic brain disease, as paralysis or the like, our prognosis should be favourable but guarded. Favourable, because the presumption is on the side of recovery; but guarded, inasmuch as the facts already stated show that there is no very distinctly-marked line of separation between the symptoms of curable and incurable disease. Moreover, it is always dangerous to predict where we cannot clearly foresee.

The treatment of brain exhaustion may be summed up in a few words. Insure instant cessation of work, and absolute long-continued rest of body and mind. Procure sleep by means of sedatives. Give stimulants in moderation, and a plentiful supply of nutritious food at frequent intervals. Carefully examine for, and treat on general principles, any non-cerebral mischief which may, by reflex action or

otherwise, be inducing cerebral irritation, or preventing the proper depuration and renewal of the blood. Administer cod liver oil and such tonics as can be borne, bearing in mind the caution of Dr. Handfield Jones, that "the nervous centres have been brought into such a state of hyperæsthesia by impaired nutrition that they can scarcely bear anything of a tonic character, even as a half-starved man requires, if we would save his life, to be fed sparingly for some time." Beyond securing sleep, I do not believe that narcotics or sedatives are of much value in these cases, which require to be treated upon general principles, and by means of the regeneration of the whole mass of the blood.

ON THE EXTRUSION OF THE MORPHOLOGICAL ELEMENTS OF THE BLOOD.

THE PHYSICAL PRINCIPLES CONCERNED, AND THE RELATION
WHICH SUCH EXTRUDED ELEMENTS BEAR TO PUS AND TO
THE SO-CALLED FIBRINOUS EXUDATION OF INFLAMMATION.

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HISTORY OF THE SUBJECT.

IN the year 1858 the illustrious pathologist, Professor Virchow of Berlin, spoke as follows, "There can at the present time be no longer any doubt as to the vascular system being everywhere closed by membranes. In these it is not possible to descry any porosity. Even the minute pores which have recently been observed in different parts, have not, up to the present time, met with their counterparts in the capillary membrane; and when the porosity of this membrane is spoken of, the expression can only be admitted in a physical sense, as applying to invisible, really molecular interstices. A film of collodion is not more homogeneous, nor more continuous, than the membrane of a capillary. A series of possibilities which used to be admitted, as that, for example, the continuity of the capillary membrane did not exist at certain points, simply falls to the ground. A transudation or diapedesis of the blood through the walls of the vessels, without the occurrence of any rupture, cannot for an instant be admitted; and although we cannot in every individual case point out the exact site of the rupture, it is notwithstanding quite inconceivable that the blood, with its corpuscles, should be able to pass through the walls in any other way than through a hole in them. This is such a very natural deduction from ascertained histological facts, that all discussion upon the point is impossible. Within the true capillary region, there is nothing further worthy of notice in the vessels than the nuclei I have previously mentioned, which correspond to the longitudinal axis of the vessel, and are so

imbedded in its membrane, that it is impossible to discover any traces of a surrounding cell wall. The capillary membrane is seen to be quite uniform, absolutely homogeneous and continuous.”*

In 1867, nine years later, Professor Cohnheim, also of Berlin, published some remarkable researches, affirming that he had seen both the red and the white corpuscles making their way through the walls of the capillaries, apparently without rupture, into the surrounding tissues; and also that in inflammation, supervening upon irritation experiments, he had seen the white corpuscle become adherent to the wall of the vein, make its way through the wall, and appear on the outside as the pus corpuscle. Very considerable interest was created by the statements of Cohnheim, and his experiments were repeated and corroborated by eminent physiologists and pathologists in all parts of the world.

It is a curious circumstance in the history of the subject, that, twelve years prior to the asseveration of Virchow that such things were impossible, and twenty-one years anterior to the researches of Cohnheim, an English physiologist of great repute had forestalled the necessity both of the statement and counter-statement of these illustrious German observers. Without wishing to detract in the least from the importance of Dr. Cohnheim's re-discovery, it would ill become me, as the pupil of one, now no more, who once laboured in our midst, and who but eleven short years ago by his great and practical knowledge of physiological science, inspired me, however feebly, to follow in his footsteps in the culture and advancement of his much loved science, to be silent at the present juncture. In a word, I feel that I should be recreant in my duty and unworthy so great a master, did I not once for all unhesitatingly assert the claim of Dr. Augustus Waller to all the credit that may accrue from this discovery.

In the twenty-ninth volume of the “Philosophical Magazine,” (1846), in the numbers for October and November, will be found two laborious papers which amply show how much this keen-sighted original worker was in these matters in advance of his time.

The first of these papers, entitled “A microscopic examination of some of the principal tissues of the animal frame, as observed in the tongue of the living frog, toad, &c.,” left the hands of its author, September 21st, 1846, and the second paper, entitled “Microscopic observations on the perforation of the capillaries by

* “Cell. Pathology,” p. 113. (Chance.)

the corpuscles of the blood, and on the origin of mucus and pus-globules," is dated October 15th of the same year.

Not only had this investigator observed the escape of both the red and white corpuscles from the capillary vessels, but it is quite clear that he fully appreciated the important bearing of the observation upon pathology, for in his first paper we find him saying, "Recent observations have enabled me to decide the much agitated question as to the formation of pus, and its origin from the extravasation of the colourless or spherical corpuscles from the capillaries." Postponing the full elucidation of the subject to a future occasion, he nevertheless proceeds to give two observations.

The first experiment which Dr. Waller relates, is one in which he observed the white corpuscles escaping from the vessels in the mesentery of a toad, which had been dead for three hours, and the abdominal cavity and cellular tissues of which were found distended by a limpid dropsical collection of serum, containing numerous white corpuscles and a few blood discs; and he states that the only traces observable of their points of exit were curved indentations in the vessel of the same size as the corpuscles, and a solution in the continuity of the vessel at these points.

In the second experiment he used the living frog's tongue, and in this case both the red and white corpuscles, but the latter in by far the greatest number, escaped through the walls of the capillaries, whilst no appearance of rupture could be seen in any of the vessels. After the experiment had lasted about two hours, thousands of these corpuscles were seen scattered over the membrane, with scarcely any red discs. The process by which they passed out of the vessels could be best observed in a capillary containing stationary blood corpuscles. Generally at a slight distance from it some extravasated corpuscles could be detected, and at the nearest opposite point of the tube a small concave depression was presented. Frequently near this depression, numerous corpuscles were collected within the tube, as if about to follow those which had escaped. These were frequently agitated by a movement of oscillation which showed that there was no open point in the tube. In other spots some of these corpuscles were seen protruding half out of the vessel. When however the current re-occurred in a vessel presenting these appearances, the depression and unevenness quickly disappeared, and no trace of the corpuscular extravasation could be seen, except the presence of the corpuscles themselves. "I consider therefore," says Dr. Waller, "as established—(1) the passage of these corpuscles *de*

toute pièce through the capillaries, and (2) the restorative power in the blood, which immediately closed the aperture thus formed."*

In the second communication, page 397, entitled "Microscopic observations on the perforation of the capillaries by the corpuscles of the blood, and on the origin of mucus and pus globules," Dr. Waller shows most conclusively the identity of the white corpuscles of the blood with those of mucus and pus.

As to the manner in which the corpuscles escape from the vessels, Dr. Waller does not seem to have arrived at any more satisfactory conclusions than those who have succeeded him. He however points out that it is not connected with the life of the animal, as it is observed to take place after death. He suggests that "it may be due to a solvent action of the corpuscle upon the structures composing the wall of the vessel."

It is clear from all this that my illustrious predecessor and much revered master had observed and published as early as 1846, all those facts, which, re-discovered by Cohnheim, are about to exert an important influence upon the pathological thought of this age.

The experiments of Cohnheim have been performed principally upon the mesentery and foot of the frog. For web experiments a female is selected, as in the male the presence of pigment cells obscures the view. When the mesentery is used a large frog must be chosen.

Cohnheim's plan is to induce paralysis of the entire animal without rapidly destroying life, and to this end he injects under the skin from three to five minims of a solution of Woorara, containing one grain of the poison to a fluid ounce of water. This produces complete motor paralysis in about half an hour.

This preliminary condition being achieved, a glass plate sufficiently large to support the frog is taken, and to this is attached a very thin disc of cork with a hole in the centre. The abdomen of the

* The following is Dr. Waller's description of the mode of escape. "In some instances the manner in which the corpuscle escaped from the interior of the tube could be distinctly followed; that part of the tube in contact with the external side of the corpuscle gradually disappeared, and at nearly the same time might be seen the formation of a distinct line of demarcation between the inner segment of the corpuscle and the fluid parts of the blood in contact with it. Any slight agitation was then capable of disengaging the corpuscle from the vessel to which it was now external, and in its place a concave depression remained, which appeared sufficiently protected by some membrane as to oppose effectually the exit of the discs and the fluid part of the blood." Page 399.

frog is now opened, the mesentery being carefully drawn out and stretched over the aperture in the disc of cork, and moistened from time to time by the application of a little artificial serum composed of albumen one part, common salt one tenth part, and water ten parts.

The following phenomena then take place: the arteries are first seen to contract, then gradually dilate, until in about an hour and a half they attain their maximum. The current at first becomes more rapid, then gradually retarded, and in about two hours from the commencement a movement of oscillation takes place preparatory to the occurrence of complete stasis. It is during this stage that the corpuscles, especially the white ones, may be seen to escape from the vessels, principally from the small veins, but also from the capillaries. In this experiment the stasis which occurs is believed to be the result of inflammation, produced by exposure of the serous membrane to the air, and the white corpuscles will be seen to pass out in far greater numbers than the red ones.

The second experiment of Cohnheim's is simply a variation of Weber's form of stasis as induced by strangulation of a limb, and which I showed in 1862* to be altogether a different kind of stasis

* Confusion has been introduced into the question of stasis as related to inflammation, by neglecting to discriminate between the various forms of stasis, of which there are four:—

(1) If the frog's web be exposed to certain irritants, (*e.g.* vapour of chloroform,) the arteries are so constricted that the heart force is temporarily shut off from the capillaries, which become packed by the reflux of blood from the veins. This form of stasis is dissipated immediately on the cessation of the arterial constriction. The blueness of the extremities consequent upon exposure to cold is probably dependent upon the same mechanism.

(2) The second form of stasis depends upon such enfeeblement of the heart's action as interferes with the due propulsion of blood into the extreme vessels. It also disappears upon the re-establishment of a sufficient propulsive power.

(3) The third form is that described by H. Weber, as follows: "If a limb (of a frog) be strangulated, there arises in its web, within four to eight hours, without any irritation being applied, a stasis which is identical with inflammatory stasis, except that after sixty hours' duration it will be dissipated as soon as the circulation is set free." The removal of this form of stasis by the re-establishment of the circulation distinguishes it from inflammatory stasis and shows its relation to the forms already described.

(4) The fourth form of stasis is producible (artificially) by the application of irritants, and has for its specific characteristics—

a) It is readily induced when the heart-force is unimpaired and the blood-channels are free;

from that homogeneous form which accompanies true inflammatory action. A portion of skin is removed from the inner part of the groin, so as to expose the femoral vein, around which a ligature may be tied, or other means adopted for arresting the circulation in the vein; practically it is found better to take up a portion of the muscle with the vein.

The immediate effect of the application of the ligature is to retard the stream of blood and to cause dilatation of the veins, the current gradually becoming slower and slower, until the usual oscillating movements commence, preparatory to the occurrence of stasis. The blood corpuscles are seen to be collected in masses, while a few solitary individuals lie attached to the parietes of the vessels. The wall now becomes pouched and sometimes the corpuscles may be seen to pass out even during the occurrence of stasis in the vessel. When, however, the vein is released from the ligature the process takes place rapidly, and red corpuscles may be seen in every stage of transit through the walls: some, adherent by a slender process to the inner wall, vibrate backward and forward in consequence of repeated blows, received from successive corpuscles passing along in the stream; others are firmly impacted in the walls; and others again are only slightly adherent to the outer wall, or are found in the surrounding tissues. The web must be occasionally moistened and not allowed to become inflamed if it can possibly be avoided.*

b) It requires hours or even days for its dissipation, or it may even be irresolvable;

c) It presents under the microscope a homogeneous appearance as if the vessels had been injected with tinted size or gelatine. The outlines of the corpuscles are undistinguishable. I call this "homogeneous" or "inflammatory" stasis.—Proceedings Royal Society, 1862.

* The fact that adhesiveness of the corpuscles was produced in the vessels of the web, is I think, a sufficient evidence that all the precautions taken failed to prevent the occurrence of the initial phenomena of inflammation. These earlier changes must be regarded as the primary effects of irritation, by which we mean that a part or structure is subjected to active influences other than those which normally operate upon it. The following observations of Professor Lister as bearing upon this point are worthy of the utmost consideration:—"Thus if a large vein happened to run through the spot upon which the mustard was placed, it became in time choked with a crimson mass of corpuscles in that part of its extent which lay beneath the mustard; but immediately beyond in both directions, the blood in it contained no more than the usual proportion of corpuscles, or sometimes considerably less; and these moved freely to and fro when the web was touched,

An able paper upon this subject was contributed last year to the British Association by Dr. Caton of Liverpool.* This author noticed—

(1) A slight dilatation of the vessels, making the exposed mesentery redder to the naked eye.

(2) A general retardation of the blood-flow, commencing in the veins and capillaries, and, when complete stasis had occurred in

whereas those within the area remained fixed." Again, "Another important fact which was brought out by this class of experiments is, that mere quiescence of the blood in the vessels of a healthy part fails to induce aggregation of the red corpuscles. In the parts which had not been subjected to irritation, the corpuscles exhibited no trace of adhesiveness; and though completely at rest they were nowhere seen to be grouped together. . . . On one occasion when examining the tissues of the web of a frog under chloroform, the limb being kept steady by a string tied tightly round the thigh, so as completely to arrest the circulation, I was particularly struck with the want of adhesiveness in the red corpuscles; so much so that as the foot had been kept moist without circulation for about three hours, I suspected that it must have imbibed water, which, when mixed with blood outside the body, destroys altogether the adhesiveness of the red corpuscles. This, however, proved to be a mistake, for having occasion to administer more chloroform, I applied it on a piece of lint of considerable size without taking the usual precaution of protecting the foot from the vapour, and left it so for about a quarter of an hour. On re-examination of the web, the red corpuscles were found to possess mutual adhesiveness, and in the larger vessels were grouped together into masses with considerable spaces of clear liquor sanguinis, just as in the best marked forms of aggregation in frog's blood outside the body."—Lister, on "The Early Stages of Inflammation." Pages 667-8.

As to the ease with which irritation is induced, Professor Lister remarks as follows:—"In perfect health the colourless corpuscles are as free from adhesiveness as the red discs, but like them assume that property in a degree proportionate to the amount of irritation to which the part has been subjected. When the irritation has been very slight, the white corpuscles, which are susceptible of much greater adhesiveness than the red, (as we learn from examining blood outside the body,) acquire some tendency to stick to the vascular parietes, while the red discs still move on in a manner generally regarded as consistent with health, though really lagging slightly behind the liquor sanguinis, and consequently presenting themselves in somewhat abnormal proportion."—Page 670, *ibid.*

As adhesion of the corpuscles must be regarded as one of the earlier phenomena which occur in the chain of circumstances constituting inflammation, we are bound to consider inflammatory conditions to have been present in Cohnheim's experiments upon webs.

* Contributions to the Cell-Migration Theory, by Richard Caton, M.D., "Edinburgh Journal of Anatomy and Physiology," No. VII., November 1870.

these, advance and regress of the corpuscles in the arterics, corresponding to every systole and diastole.*

(3) The white cells, when first observed after the operation, (opening of peritoneum,) were being carried along in the general stream in the veins generally occupying the "lymph space," where they could be traced rolling along at a somewhat slower pace than that of the red globules. After a time the white corpuscles became less circular in outline, and showed a tendency to adhere to the walls of the veins; later still, large numbers of the white cells were deposited from the stream, and covered the surface of the veins, and partially so of the capillaries. When the arterial current became slow, a few were also seen deposited in the arterics.

Some of the most interesting of Dr. Caton's observations were made upon the tadpole, and he found—

(1) That migration of the blood-cells takes place much easier, and to a far greater extent, in it than in the frog, and that in a congested state of the circulation corpuscles rapidly escape from the vessels at any part of their course.

(2) The vessels have indistinctly defined walls, and appear as though they were little more than channels hollowed out in the jelly-like substance of the tail.

(3) Any interference with the return of venous blood produces migration of red corpuscles very quickly, as Cohnheim has shown to occur in the foot of the frog when the femoral vein is tied. (Vide note, page 246.)

(4) If any injury, or the irritation produced by a constrained position, has produced that peculiar softened and plastic condition of the white cells in which they adhere to the walls of the veins, and

* "Stasis generally occurs first at the venous radicles, because here the *vis a tergo* is weaker."

"If in a frog's web homogeneous stasis has occurred in the venous radicles so as completely to prevent the passage of blood into the veins, the current in the capillaries and supplying arteries might naturally be expected to be brought to a stand, as it certainly would be if the walls of the capillaries removed from the immediate seat of the obstruction were impervious; but so far from this being the case, the blood brought to the part is seen to pass on in a perfectly regular manner without the slightest rebound. This absence of rebound is an evidence that the liquor sanguinis is passing through the vascular parietes at the same rate it is being propelled into the obstructed vessels. It is not till the capillaries become packed with corpuscles, and the circulation is confined to the arterial trunk, that any rebound after ventricular contraction becomes apparent."—Proceedings Royal Society, August 28th, 1862.

if a coating of white cells has in consequence lined the veins before congestion occurs, the white cells migrate in the place of the red. White cells may be seen to escape from a vein, and red ones from an adjoining vessel, the latter often forming upon the vessel sides clump-like masses of adherent corpuscular matter.*

(5) The sizes of the apertures through which the corpuscles pass appear to be variable, sometimes appearing to be narrow, at other times the cell sinks through the wall without undergoing much change of form.

* In these experiments the tadpole was laid upon its side in the stage trough with a cover-glass resting on its tail, and after being in this position for an hour, as a rule, both red and white corpuscles were seen to begin to migrate. It is admitted that general feverishness, as indicated by increased action of the heart, was induced, but it was stated that no appearance of local irritation existed. As further on in the paper it is admitted that, when either general fever or local inflammation exists, the white corpuscles are attracted to the sides of the vessel and rapidly deposited, forming often a complete coating to the veins, it is presumable that in the case where local irritation was supposed to be absent, this adhesiveness of the white corpuscles existed. Professor Lister states, and I think with great correctness, that the adhesiveness of the white corpuscle is invariably an evidence of local irritation, and is limited to the part irritated; vide note to page 246, also the following.

"The adhesiveness of the white corpuscles, as of the red ones, is limited to the part irritated. A very good example of this presented itself on one occasion, when a minute drop of chloroform was applied to a small part of a healthy web, so as to induce full dilatation of the arteries and great excess of corpuscles without absolute stagnation. It happened that the part affected was supplied with blood from the branches coming from one side of a principal artery, the main trunk being seated just above the limit between the irritated area and the healthy region, the adjacent part of which received supply from the branches of the vessel on the other side. The latter showed no appearance of adhering white corpuscles, nor did the capillaries which were fed by them; but those of the irritated part, though springing from the same trunk, were remarkably encrusted with them, from their origin to their minutest ramifications within the area, while the capillaries and veins in the same part were similarly affected. This striking appearance continued for hours after the chloroform had been applied. Thus the affection of the white corpuscles of the blood in an irritated part is in all respects strictly parallel to that of the red discs, while the greater adhesiveness of which the former are capable, renders the facts regarding them more obvious and unmistakable."—"Early Stages of Inflammation," page 671.

In the face of facts such as these, it would appear that local irritation and corpuscular adhesiveness are related to each other as cause and effect, and that when the latter is seen to exist, the former may be safely inferred; if this be so, we are justified, in every case of corpuscular extrusion, in affirming the co-existence of irritative or inflammatory action.

(6) In tadpoles which were kept in tanks on artificial diet, and which were debilitated and affected with parasites, the author considers he has observed the occurrence of migration of both red and white cells, in the absence of local inflammation.

In a paper read to the Pathological Society of London, April 21st, 1868, Dr. H. Charlton Bastian gives an excellent *resumé* of the opinions entertained as to the mechanism of cell extrusion by foreign observers, to which he appends the results of his own inquiries. I shall take the liberty of transcribing a few passages of this valuable paper.

“Cohnheim himself adopts the view propounded by Oedmansen, that the capillaries are formed by the juxtaposition of a number of flat epithelial cells, in the angles of union of which certain stomata exist, through which as he thinks the corpuscles are forced by reason of the increased pressure in the vessels, and favoured by the transverse position previously assumed by the corpuscles themselves. This view as to the structure of the capillaries is based upon the appearances presented by these vessels after staining with a weak solution of nitrate of silver, when the ordinary brown lines are said to be produced, such as exist in pavement epithelium in other situations.

“Stricker, who has made careful observations on the genesis and structure of the capillaries, rejects *in toto* this theory, and maintains that their formation by the juxtaposition of epithelial cells is directly negatived by observations he has himself made upon the subject. He believes them to be composed of a yielding, homogeneous protoplasm of a contractile character, and which, in harmony with the properties of this substance, generally has the power of developing processes or outgrowths.

“These, Stricker says he has seen developed from the walls of the capillaries, and he maintains that they subsequently become channelled, and unite with other similar processes, so as to form new capillaries. His explanation, and also Prussak's, of this passage of the red blood corpuscles is, not that they are forced though certain pre-existing pores in the capillary walls, but that they pass out by virtue of some ‘active condition’ of the capillary wall itself.”*

* Assuming that some peculiar condition of the capillary wall exists equivalent to what Stricker designates “an active condition,” it is quite certain, from the observation made by Dr. Waller of the corpuscles behaving in the same way after death, that this condition has nothing to do with the capillary wall as a vital structure.

Dr. Bastian disagrees with both these explanations, and is of opinion "that the corpuscles pass out in all these conditions, whether in inflammation, in the artificial scorbutic state, or in mechanical congestion,* by virtue of certain active amoeboid movements to which the red corpuscles have been excited, owing to alterations in the nature of the blood plasma having an irritating effect upon them; in fact, that they effect their outward passage by dint of amoeboid movements such as the white blood corpuscle has been long known to exhibit."

Dr. Bastian says he was led to adopt this view by watching the phenomena of inflammation in the frog's foot; he found "that in certain capillaries beyond the region where this process existed in its greatest intensity, and in capillaries through which the blood was still flowing, certain red corpuscles seemed occasionally to linger by the side of the capillary, applying their flat surfaces against its walls. Sometimes these were swept away by the blood stream passing over them, and occasionally, before they were completely separated from the capillary wall, I have seen them adhering to this for a moment or two by means of a small thread-like process, as though adhesion to some portion of the capillary wall had taken place, which had only been overcome by the blood stream after the drawing out of a tag-like projection from the yielding substance of the corpuscle. Other corpuscles, which had applied themselves to the capillary wall in the manner above described, were not swept away, and in the space of about fifteen or twenty minutes a distinct projection of the corpuscle was to be seen on the outer side of the capillary wall, which went on increasing till the whole of the corpuscle was within the tissue outside the vessel. This taking place while corpuscles and blood plasma were still freely circulating through the capillary."

In repeating Cohnheim's experiment on mechanical congestion, Dr. Bastian affirms that he has "almost invariably seen that the first corpuscles which penetrate the walls of the capillaries are, not those situated in the vessels which have undergone complete stasis and have become fused together, but rather those contained in capillaries in which an oscillation of blood plasma and corpuscles is still taking place. Here also individual corpuscles apply themselves to the capillary wall by one of their surfaces, and after a time the process of perforation takes place.

* Vide notes, pages 246-9.

"Occasionally, considerable numbers of corpuscles pass out in this way from capillaries in which no stasis has taken place, and that, too, somewhat earlier than the similar exodus of corpuscles from the capillaries in which complete stasis has occurred.

"From the fact that the corpuscles pass out indifferently at all parts of the wall of the capillary, and with no approach to anything like a regular arrangement, such as one might expect to occur if they were protruded through pre-existing stomata at the junctions of epithelial cells; and because the increased tension in the vessels seems adequate to account for the passage outward of fluids from them, but not of corpuscles contained in this fluid; and, lastly, because the mode in which the corpuscles are seen to become applied by their flat surfaces to the capillary wall is the very reverse of that indicated by Cohnheim as the favourable position which the corpuscles assume for forcible extrusion through pre-existing pores," Dr. Bastian concludes that Cohnheim's explanation of the phenomena is wholly untenable, and falls back upon the amoeboid hypothesis.

He considers that "the corpuscle effects its adhesion to the wall of the capillary by throwing out a small amoeboid projection, which tends to adhere to, and commence the perforation of, the elastic and yielding capillary walls. This view being supported also by the irregular shape and frequent constrictions of the portion of the corpuscle outside the vessel when more than half of it has passed through the capillary wall." *

Dr. Caton rejects altogether the amoeboid hypothesis of Cohnheim and Bastian, and relies entirely on the two conditions of adhesion and congestion. Regarding it as essential that the cell shall be in adhesive contact with the wall of the vessel, he says,

* These tag or tail-like processes afford no evidence whatever of amoeboid movement; they are not protrusions from the corpuscle, but extensions of it, owing to its being adherent at one point or part to the vessel wall. The phenomenon is by no means peculiar to the blood corpuscle, but, as I have before pointed out, may be seen in connection with small masses of liquids submerged in dissimilar liquids. "Again, if a small quantity of chloroform or bisulphuret of carbon be poured into water, the greater portion will sink to the bottom of the water in globules of various sizes. These globules frequently adhere to the flat bottom of the vessel, and on an attempt being made to move them (by shaking the liquid) tail-like appendages are produced."—On "The Causes of various Phenomena of Attraction and Adhesion, as exhibited in Solid Bodies, Films, Vesicles, Liquid Globules, and Blood Corpuscles," Proceedings Royal Society, 1862.

"It seems probable that the occurrence of migration depends on two factors, viz., (1) the degree of pressure in the vessels produced by congestion, and (2) the power of resistance possessed by the walls of the vessels."

Professor Beale leans to the idea that the corpuscles escape through minute ruptures in the walls of the vessels. "Every one," he says, "who has made many minute injections is familiar with the fact that minute longitudinal rents or fissures may be made quite wide enough for a red blood corpuscle to pass through edgewise." Again, "We have a right to ask what leads the white corpuscles to move through the walls of the vessels, if no rents or fissures are made by the preceding over-distension? What determines the selection of the seat of passage? Surely to account for this we must conjure to our assistance some mysterious nerve or other agency. It would be hardly wise to maintain that the corpuscle has the will and wisdom to choose the way as well as the power to move; notwithstanding, the distinguished Virchow himself has not hesitated to accredit epithelial cells with most marvellous attributes, even of desiring to assist friendly epithelial cells in distress." *

If, now, we review the various theories which have been propounded to explain the mechanism of cell extrusion, we shall find that they are all open to very grave objections.

In the first place, the view of Cohnheim labours under the serious disability of attributing the same effect to two markedly distinct causes having nothing in common, a fact that invariably creates a *prima facie* suspicion of incorrectness. Is it at all probable that two distinct causes should be in operation in the extrusion of these corpuscles? Dr. Bastian, alive to this weak point, has endeavoured to bring both the white and red corpuscles under the same law, by assuming that the red corpuscles under irritation become endowed with amœboid powers, or that red corpuscles normally possess vital amœboid capacities, which they can only exhibit under abnormal conditions of the liquor sanguinis, which is supposed to provoke them into activity by its irritating properties.

Against this view it may be urged, that the red corpuscles have never been seen to exhibit any movements which could be with certainty referred to the amœboid class, and secondly, that it is most

* "Medical Times and Gazette," May 9th, 1868.

improbable, in the case of either the red or the white, that the soft plastic structure of the corpuscle should be capable of drilling or perforating the capillary wall, since it cannot for a moment be held that the capillary wall is less resistant than the substance of the corpuscle.

Speaking of Stricker's supposition that the corpuscles are passed through by virtue of some "active" condition of the capillary wall, Dr. Bastian says, "I have been able to observe nothing either for or against it; it seems a pure hypothesis, with not much to be said in its favour." It must be admitted that this statement of Stricker's is exceedingly vague, but I am by no means prepared to agree with Dr. Bastian that it is a pure hypothesis, for I can conceive that Stricker may have observed certain appearances which, although unable to explain, nevertheless gave rise to this idea. The probability of this will, I think, become more apparent when the view I have to propound is before the reader.*

Dr. Caton, as before stated, ignores altogether the amœboid hypothesis, and refers the outward passage of both kinds of corpuscles to the pressure from within induced by congestion.

Dr. Beale's suggestion that the corpuscles escape through minute rents in the capillaries, is opposed to the experience of all observers, who, from Waller downward, universally concur in the opinion that no permanent apertures of exit remain, and so great is the number of the extruded corpuscles in some cases, that it would be necessary to consider the vessels as ruptured all over.

It will be seen, then, that these hypotheses fall short in one important particular, inasmuch as they afford no explanation whatever of by far the most singular part of the process, viz., the fact that the apertures through which the corpuscles pass, again close up and become invisible. The question indeed is, not so much how the corpuscles get out, as how they get out without leaving any permanent trace of the apertures through which they have so recently passed, and which were so palpable during the period of transit.

Before proceeding to elaborate my own views, it may be well to re-state succinctly the various points upon which observers are agreed.

(1) Both white and red corpuscles pass out of the vessels through apertures which can neither be seen before their ingress

* Vide notes, pages 244 and 250.

into, or egress from, the vessel wall, but only during the period of transit.

(2) An essential and primary step in the process is, that the corpuscles shall adhere, or more properly cohere, to the wall of the vessel.

(3) These cohering corpuscles are subsequently subjected to pressure from within.

With these conditions fully before our minds, we will proceed to enquire if in physics we can find the analogue of these seemingly mysterious phenomena.

PHYSICAL PRINCIPLES CONCERNED IN EXTRUSION OF THE CORPUSCULAR ELEMENTS.

In the first place, this phenomenon of the passage of bodies through films or membranes is by no means confined to the capillary walls, the same thing having been observed in connection with nucleated blood corpuscles, such, for example, as those of the frog. In these cases no rupture or aperture of exit has been discovered.

It is obvious that the escape of the nucleus from its capsule without rupture, and the passage of the entire blood corpuscle through the capillary wall without rupture, are phenomena of the same class, and the explanation which will suffice to clear up the one will also apply with equal force to the other.

As a matter of fact, it will be admitted that we can form no *a priori* conception of one form-retaining body passing through another without either rupturing it, or distending certain holes or pores which it may already possess. This, however, is just one of those cases in which conceivability is no test whatever of possibility.

To comprehend these phenomena it is necessary to bear in mind the ultimate constitution of those animal membranes which form alike the capsules of the corpuscles and the parietes of the capillaries. All the membranes which enter into the animal body may be divided into two orders—(a) the very fine, structureless, homogeneous films, which must be regarded as simple cohesion-membranes, in contradistinction to the second order of (b) coarser membranes, to which certain mechanical arrangements are super-added, which have the effect of increasing their strength, such, for example, as structure, the result of interlacing fibres. In

films of collodion, gelatine, albumen, india rubber, soap, we have examples of the first class of membranes.

It is with this class that we are now concerned, and these are susceptible of two states, the fixed or rigid condition, and the contractile or elastic colloidal state dependent upon the presence of the principle of "flow," which principle may be operative in every shade and degree, from perfect liquidity to absolute rigidity.

It will be sufficient to state here that the more colloid and plastic these membranes are, or, in other words, the more they approximate in their constitution to liquids, so do they proportionately cease to obey exclusively the laws of rigid bodies, and begin to exhibit intermediate properties or qualities, some of which belong to solids and others to liquids.

We may take the soap film as the best illustration we can find, on a large scale, of the class of homogeneous cohesion films possessing in the greatest perfection this principle of "flow," and as exhibiting to the fullest extent phenomena which I have generalized under the term, "Progressive cohesive attraction."

By the study of the soap-film we may acquire a knowledge of many of the laws which are operative in connection with delicate colloidal films in general.*

The steps, for example, in the production of an ordinary soap-sphere are very remarkable, as exemplifying the power which these films possess, under the influence of progressive cohesion, to perfect any absence of continuity which may exist in their structure.

The first essential in the process of forming a soap-sphere is the production, upon the mouth of the pipe-bowl, of a film stretching evenly across from every point of the circumference. The production of this film is a far more complex operation than is generally supposed.

If for the pipe-bowl we substitute a ring, having a diameter of from twelve to eighteen inches, we are enabled to watch, as the process proceeds, the manner in which the film is formed.

Having submerged the ring in a solution of soap, we observe, as we gradually raise it out, that its circumference brings up from the

* All the experiments about to be detailed may readily be performed on a smaller scale on films and structures formed from such colloid substances as albumen, globulin, gelatine, &c., both in the soluble and in the isomeric or pectous condition.

FIG. 1

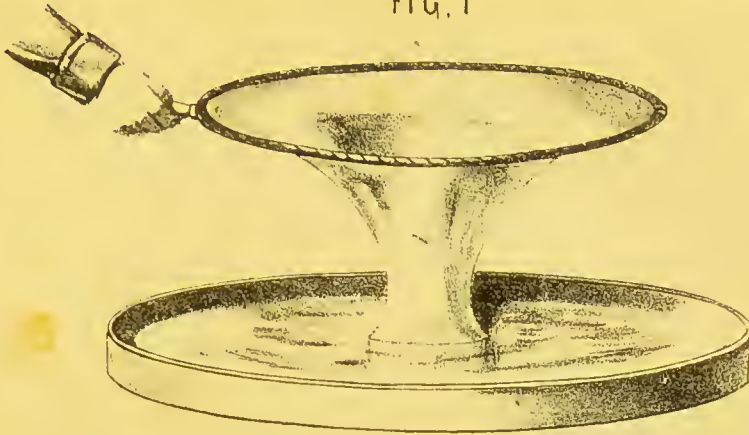


FIG. 2

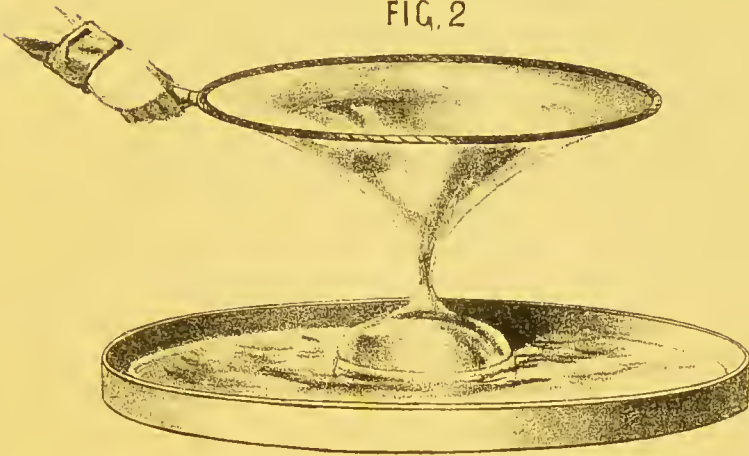
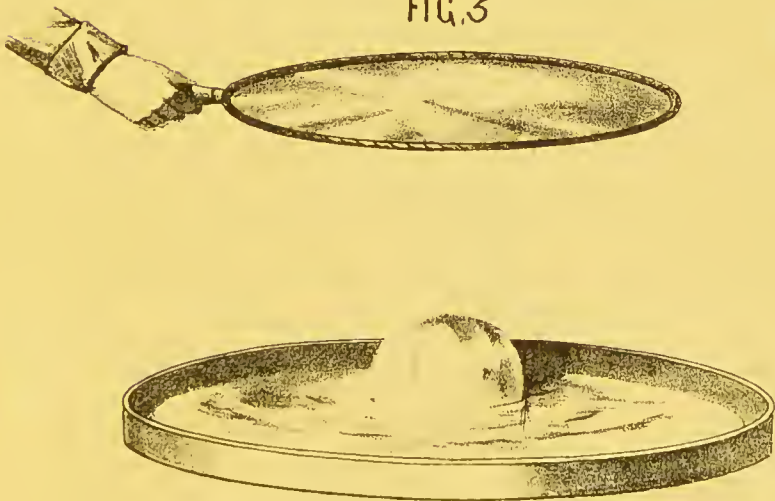
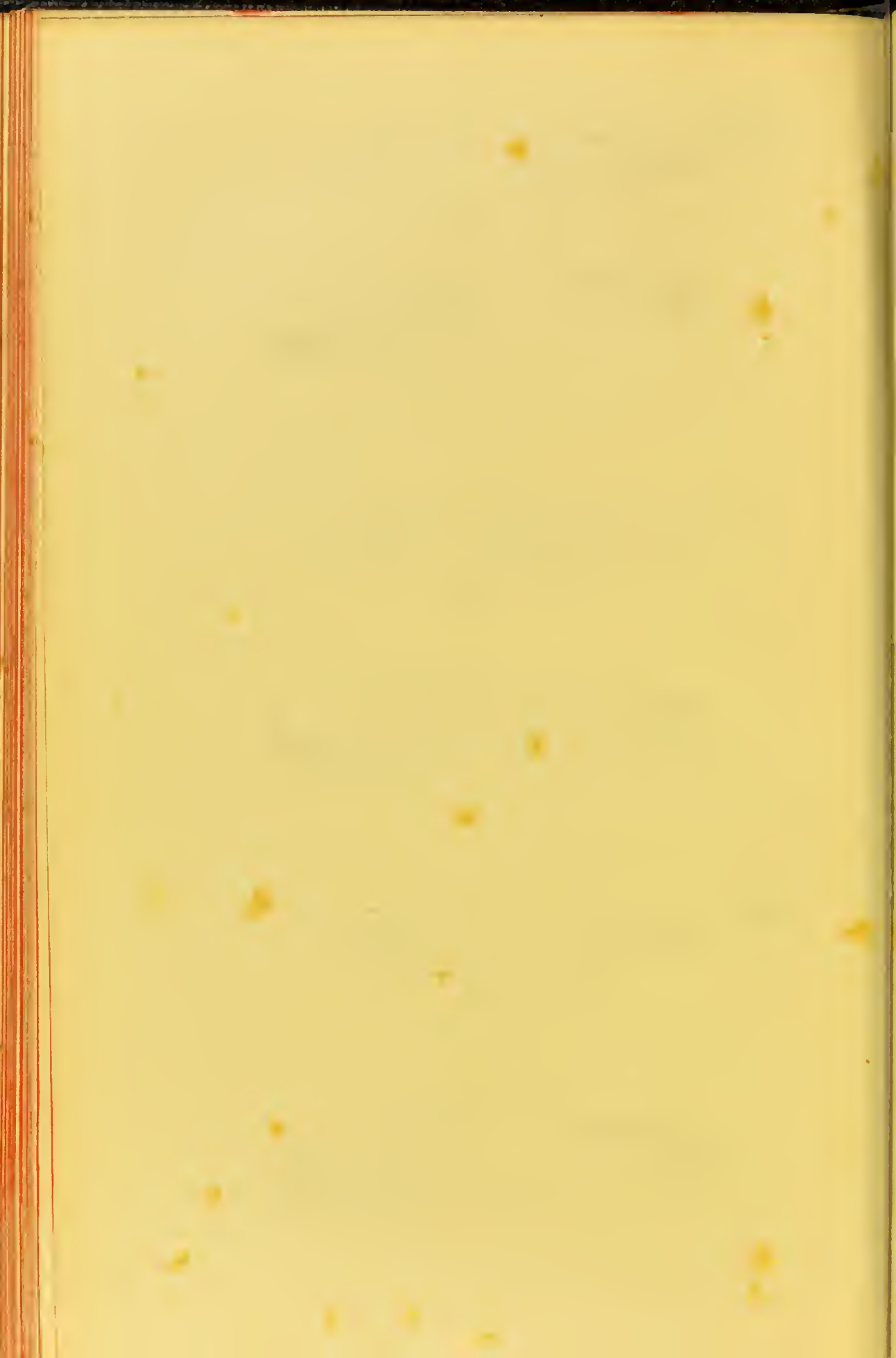


FIG. 3





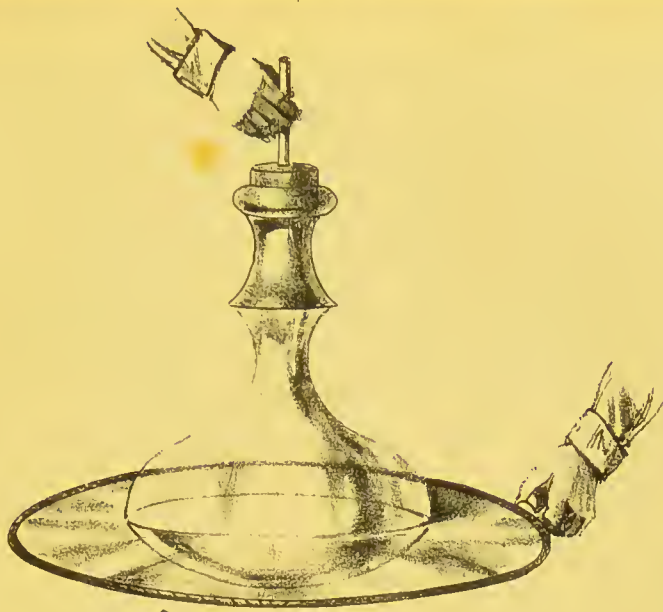


FIG. 2.

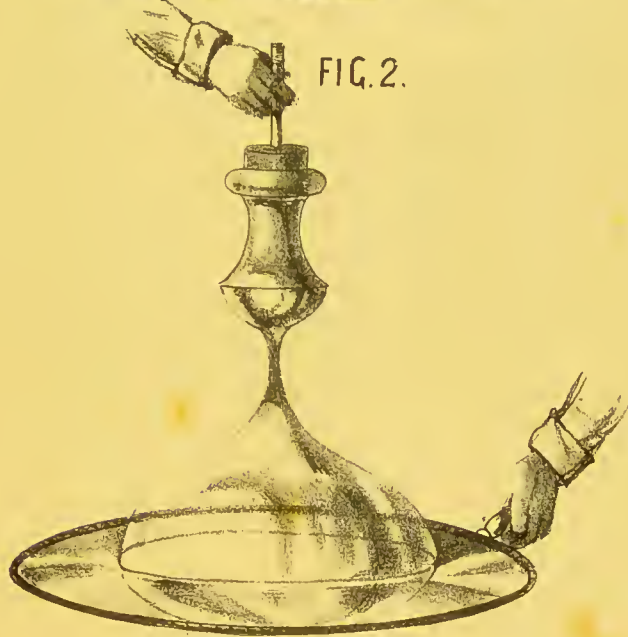


FIG. 3.

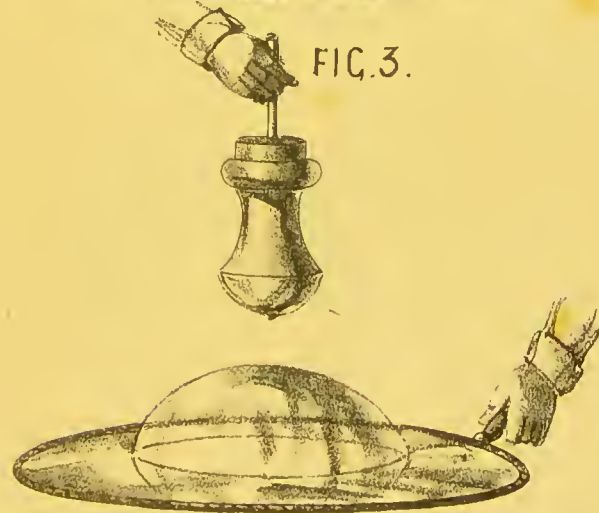


FIG.1.



FIG.2.



FIG.3.



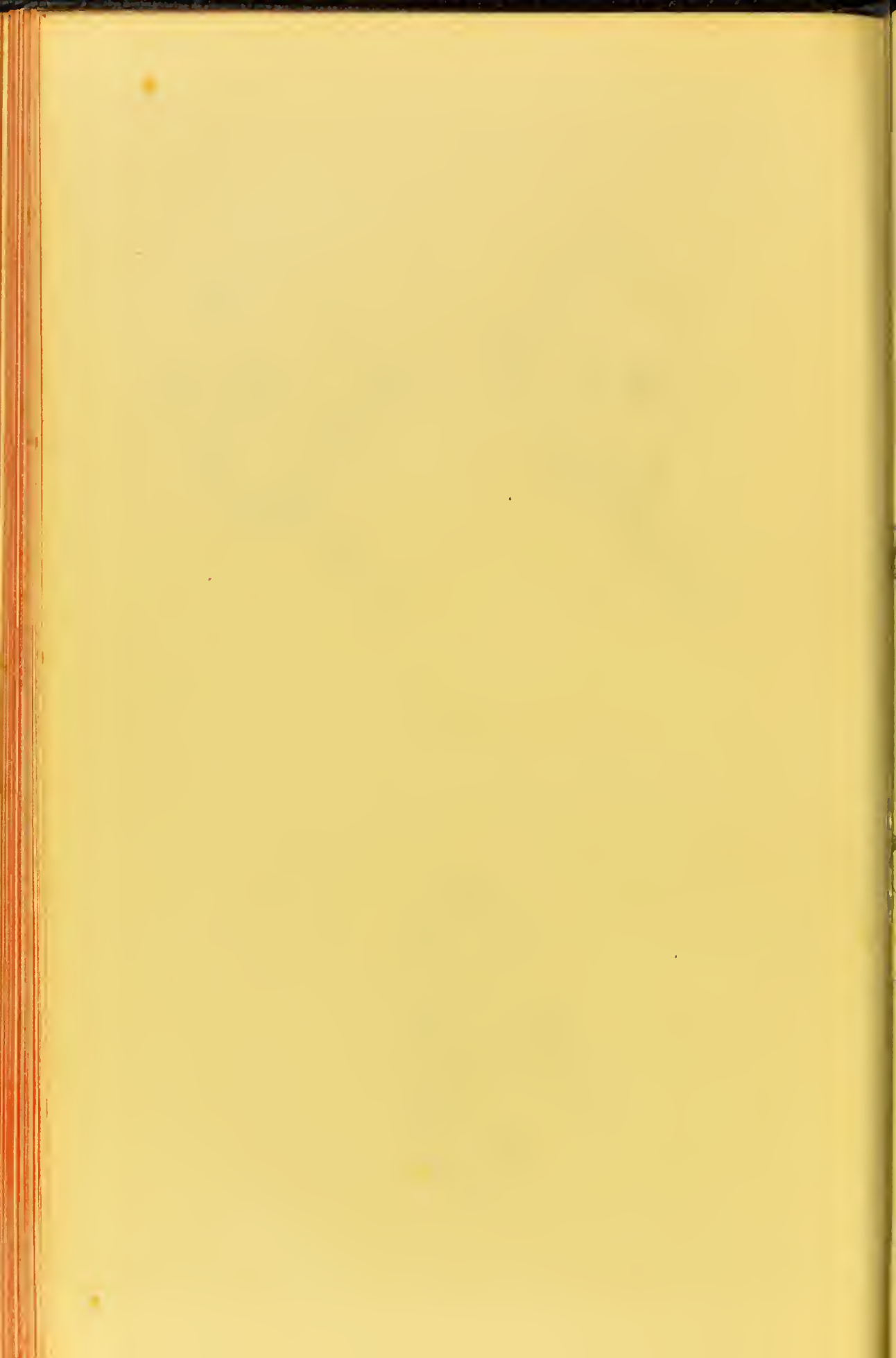


FIG.1.

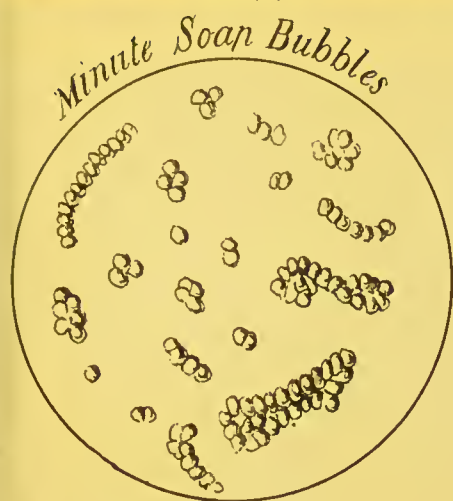


FIG.2. PLATE VI

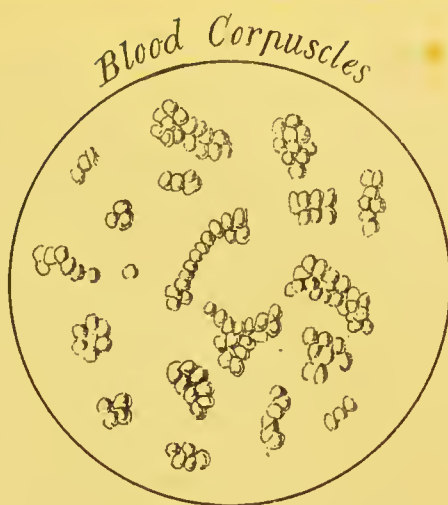


FIG.3.

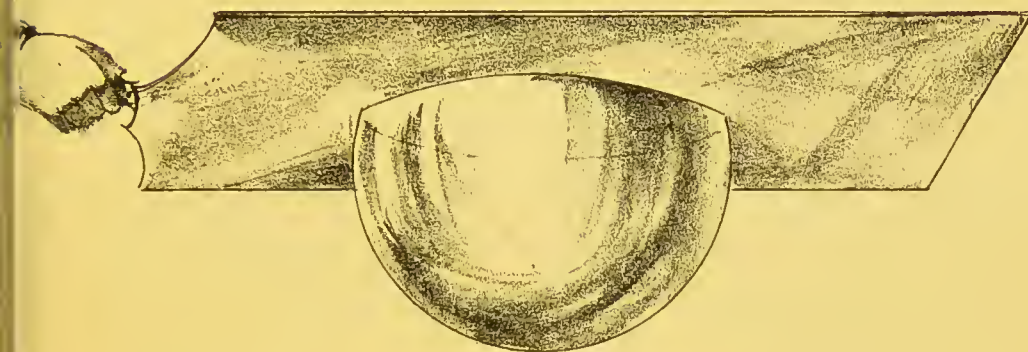


FIG.4.

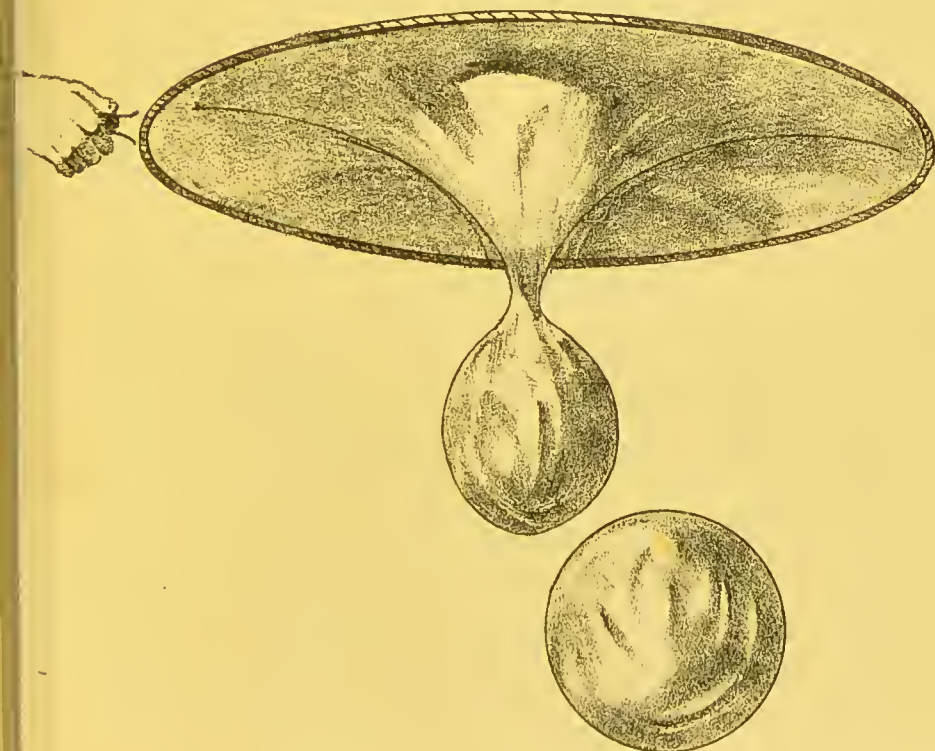


FIG. 1



FIG. 2

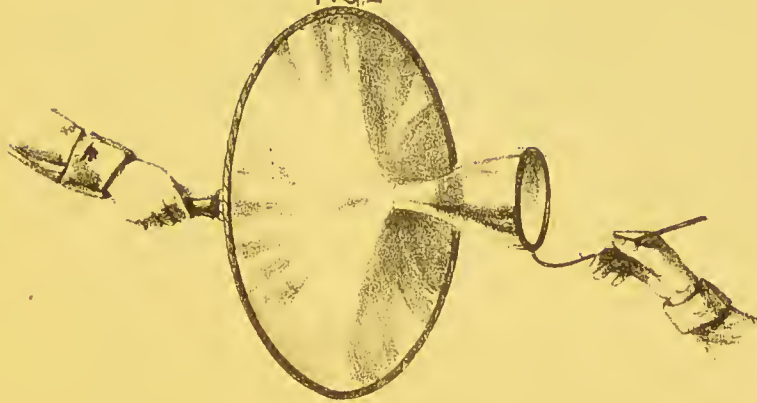
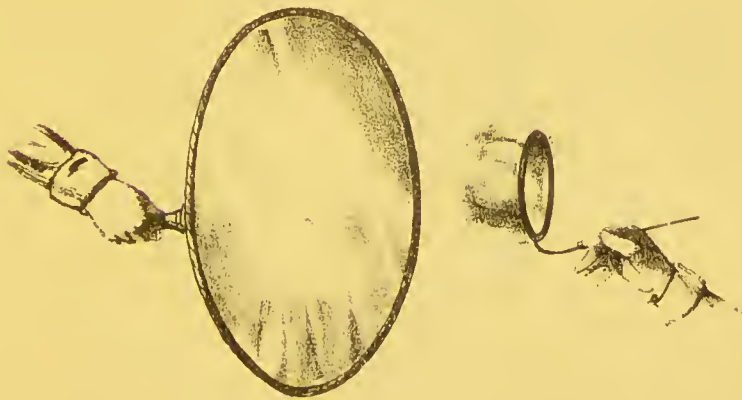


FIG. 3



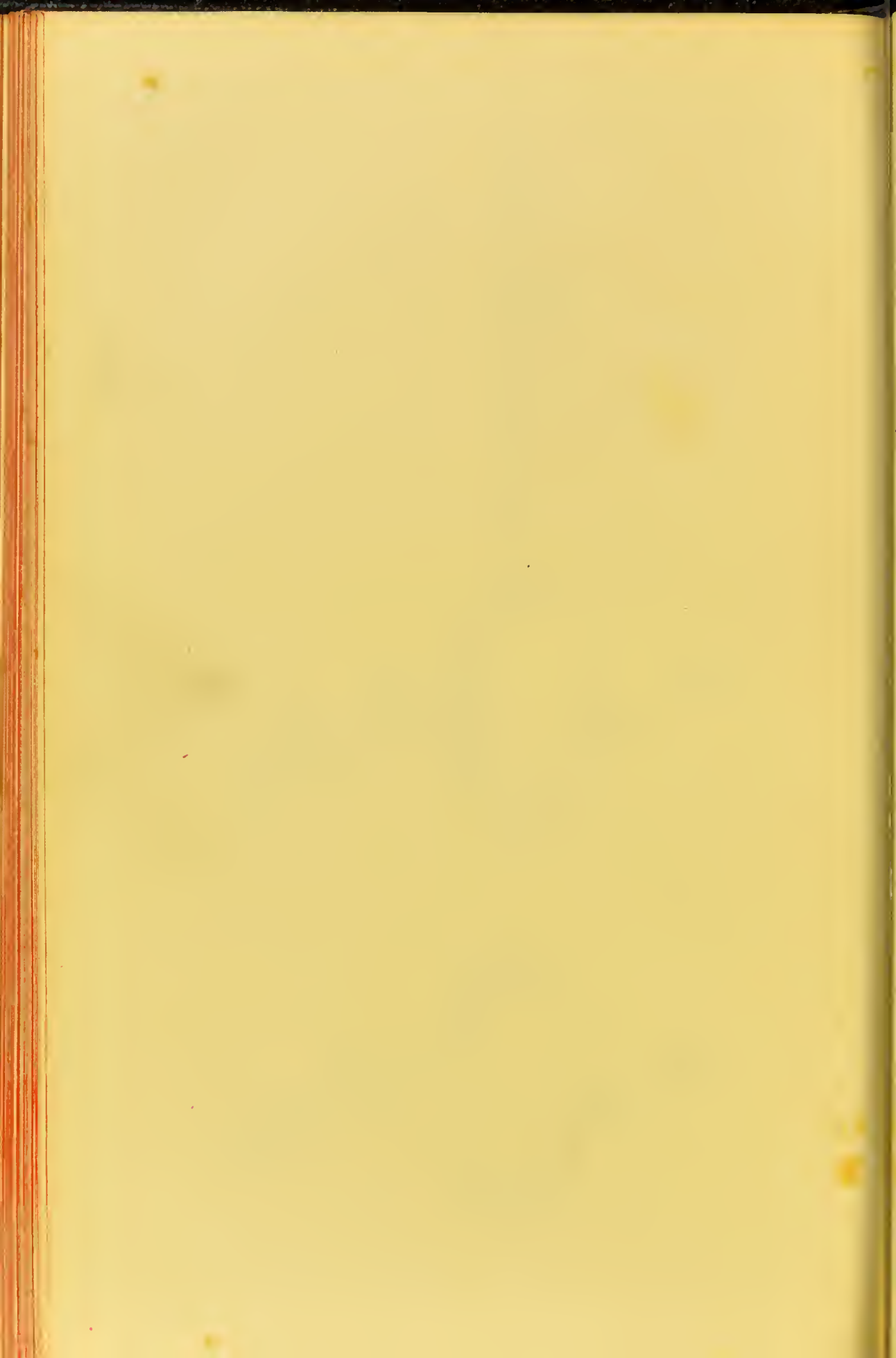


FIG.1

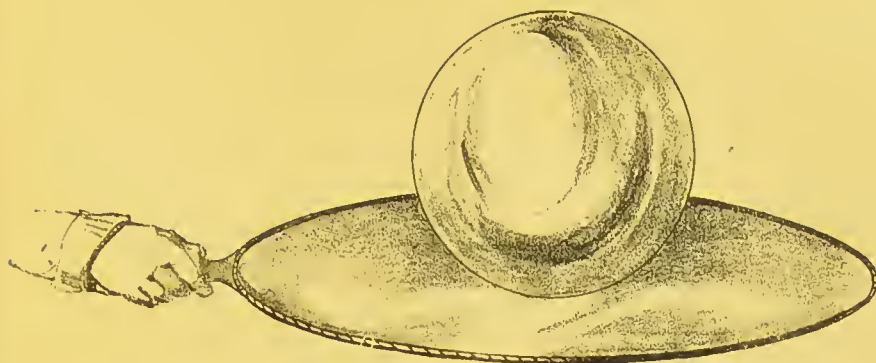


FIG.2.

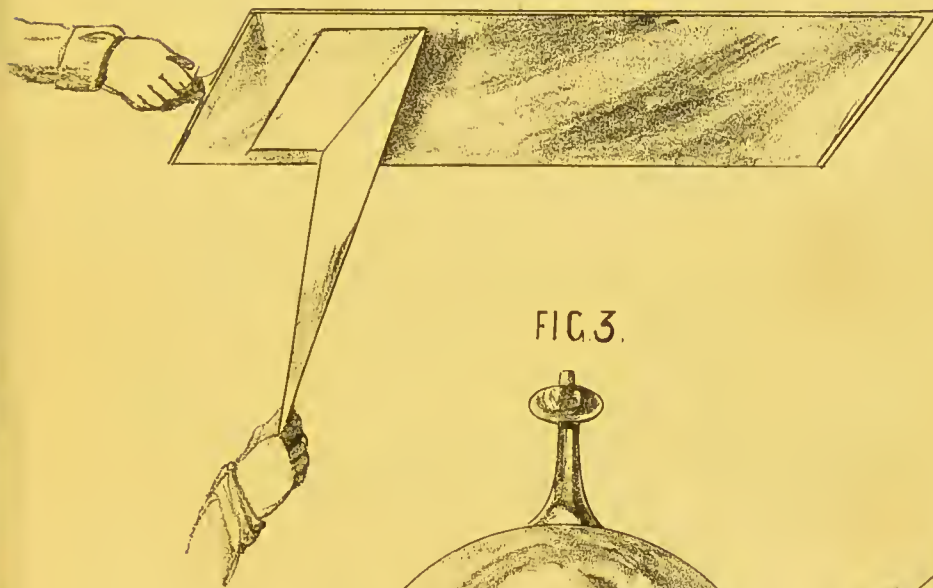
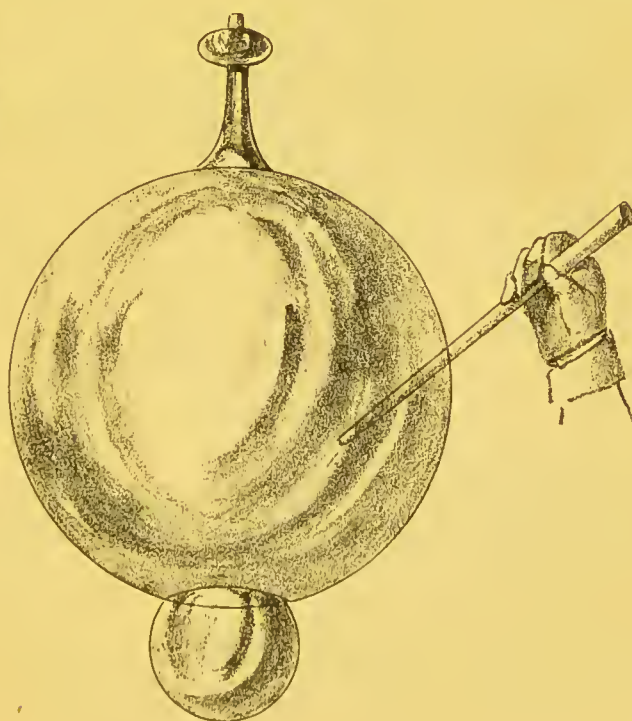


FIG.3.



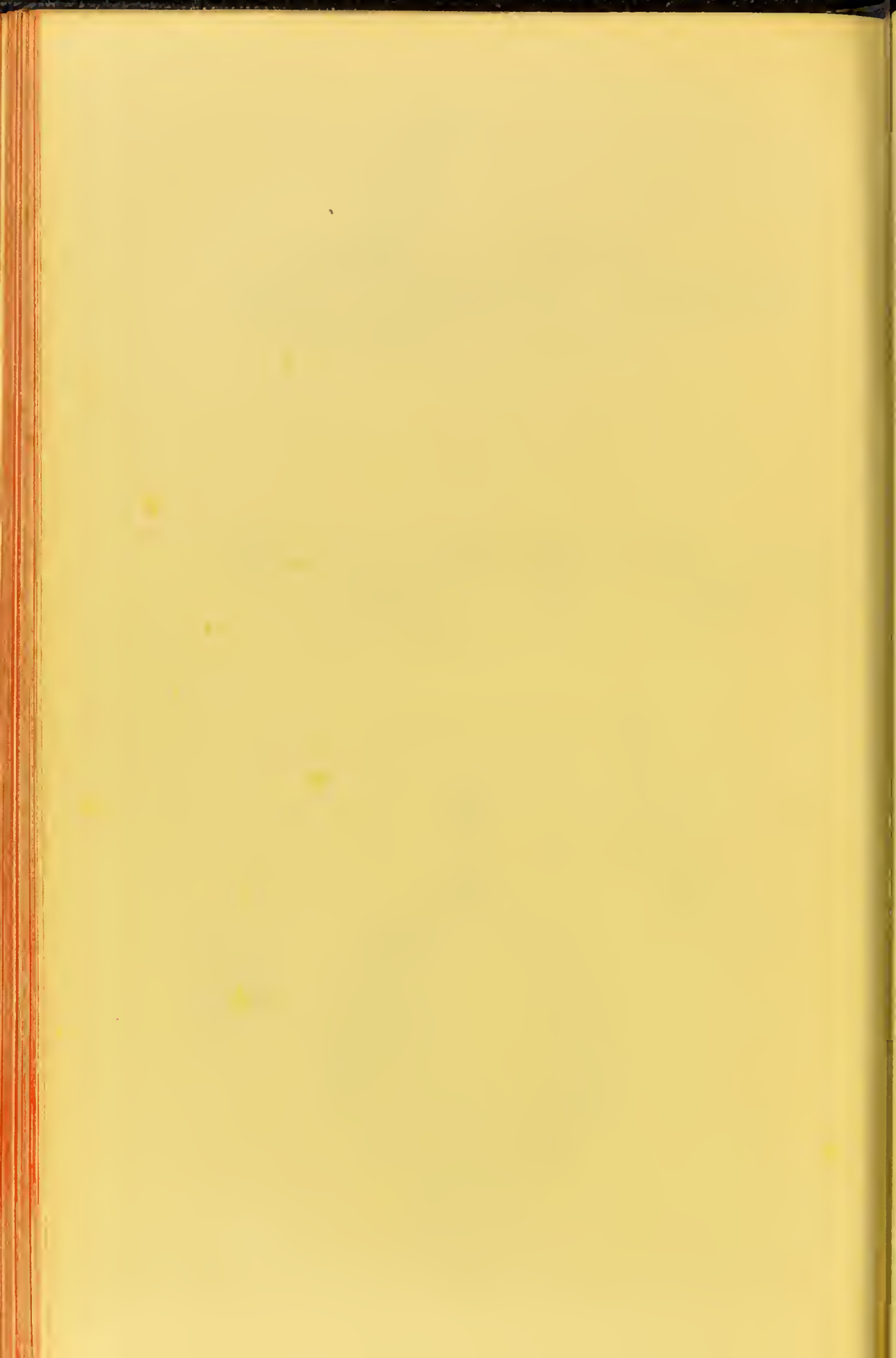


FIG. 1.

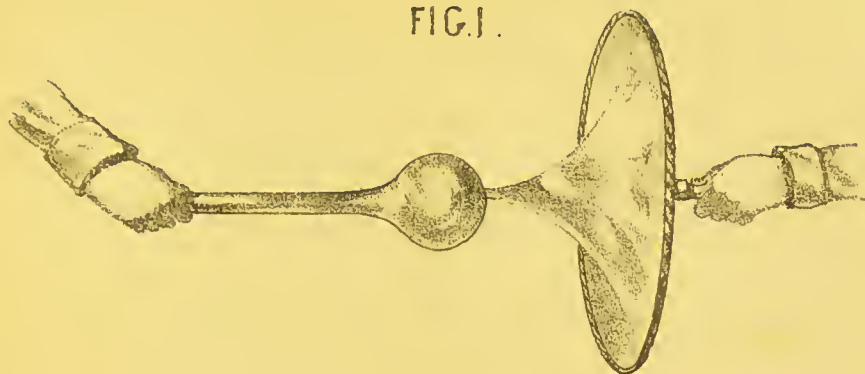


FIG. 2.

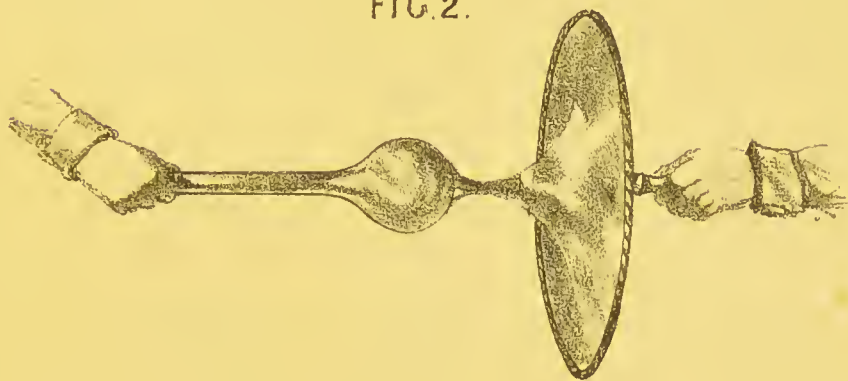
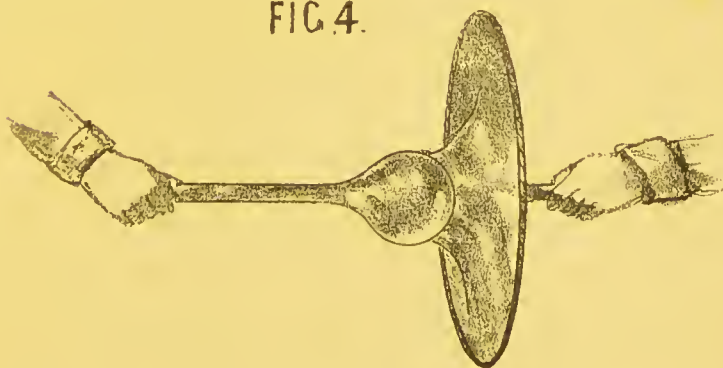


FIG. 3.



FIG. 4.





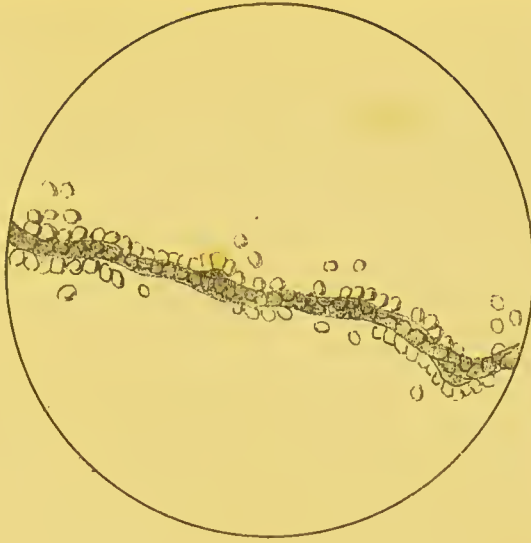


FIG.2.

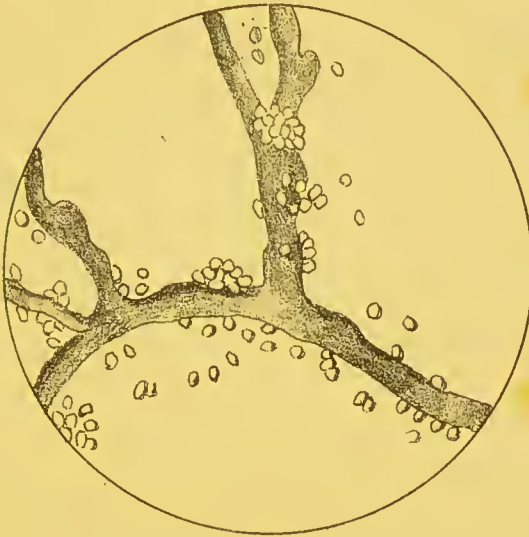
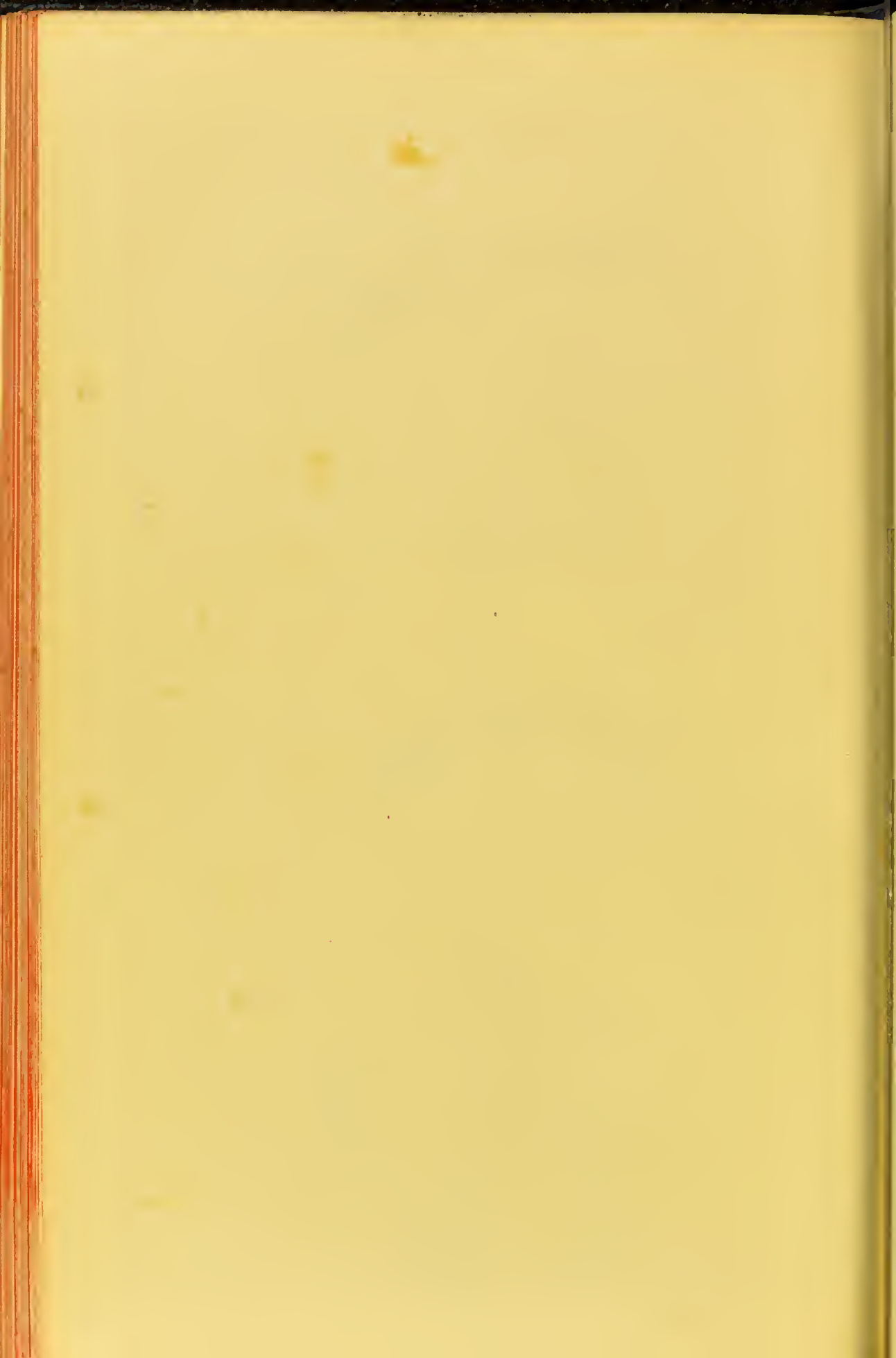


FIG.3.





liquid a band-like film of a cylindrical or tubular form, which is attached to the ring above and the liquid below; raising up the ring still higher we find that this annular film contracts in diameter at every part except at its attachment to the circumference of the ring, which is of course fixed. This quality of the film to contract between opposing points of extension causes it to take on the shape of an inverted cone with curved sides, the convexities of which are directed inward. The tendency to assume the inverted cone shape is further assisted by the fact, that the film in contracting travels inward upon the surface of the solution towards a central point, so that from the ring downward to the surface of the solution the diameter of the tubular film is continually decreasing. The shortest diameter is not, however, immediately upon the surface of the liquid, but at a little distance from it, and consequently, as the contraction proceeds, it will be at this spot that the union of the sides of the film and the separation will take place. This arises from the fact that this is the weakest point of tension between the ring and the liquid, and therefore the one in which circumferential contraction can take place with the greatest ease and effect. Thus we see that the tubular film which we have raised really becomes constricted into two portions, an upper portion which immediately contracts into a plane surface upon the ring, and a smaller and lower portion, which, in consequence of including air, becomes a hemisphere, and remains attached to the surface of the solution. (Vide figs. 1, 2, 3, Plate III.)

If having formed such a film upon a ring or pipe-bowl, we proceed to blow down upon it, we distend it into a sphere, but it is obvious that until the sphere is detached there exists a free opening into it at its upper part, which becomes suddenly sealed up by cohesion of the sides of the film, at the moment preceding detachment. The manner in which continuity is effected in the case of the soap-sphere is illustrated in Plate IV., figs. 1, 2, 3, and is seen to be a repetition of what takes place in the formation of the primary film.*

In the production, therefore, of the ordinary soap-sphere, we have no less than four examples of the maintenance of continuity

* In order that the manner in which the sphere becomes sealed up should be better observed, it has been allowed to cohere to a film previously formed upon the ring, then by slowly increasing the distance between the film and the ring, the severance can be gradually effected, and the process of division into two air-enclosing cavities watched as it proceeds.

where rupture might have been *a priori* anticipated, two in the production of the film, and two in the sealing up of the sphero.

The next point to which I will draw attention is the power possessed by these films to repair breaches of continuity that may be made in them subsequently to their formation. If any rigid body be wetted, it is quite possible to thrust it through one of these films, move it about, and again withdraw it without interfering with the integrity of the structure. In fig. 1, Plate V., a smooth, bulbous rod of glass is represented as thrust through the film; it is not, however, essential that the body should be either smooth or regular, for the same may be done with the naked fist and arm, as in fig. 2, Plate V.

I have demonstrated elsewhere that the blood corpuscles undergo a mode of aggregation in obedience to progressive mutual attraction, in precisely the same fashion as soap spheres, *i.e.* if they touch at any one point they gradually, by the operation of double cohesion, convert each other into polyhedral shaped bodies.* (Vide Plate VI., figs. 1 and 2.)

If we take any smooth rigid surface and allow any point in the circumference of a bubble to impinge against it, we find that it becomes so drawn down to the plate in every direction from this point as a centre as to take on a hemispherical form. (Vide Plate VI., fig. 3.)

But if for the rigid surface we substitute a delicate plastic film, such as the soap film, and allow the bubble to come in contact with it at one point, taking care that there is a free supply of liquid upon its exterior at this point, we observe that the result is different. In this case the soap-sphere takes on the form of two watch-glasses in apposition at their edges, one of the curves being present on each side of the film. The soap-sphere has in fact penetrated the film and arranged itself so that half is on one side and half on the other. (Vide fig. 1, Plate VII.)

Now this is precisely analogous to what takes place with the capillary when the corpuscle has entered into cohesion with its wall, "a protuberance is seen on the outer surface."

If we can subject this soap-sphere to pressure on one side only, we shall cause it to protrude through the film still further; this we can do by forming one sphere within another. This inner sphere,

* Proceedings Royal Society, May 1869.

it will be observed, protrudes more than in the case of the simple film. (Vide Plate VI., fig. 3.)

That there is pressure within a bubble may be known by the fact, that, if left with an aperture in it, it will gradually force out the contained air, and become again a simple film by its strong cohesive tendency.

Further, it will be seen that we can with the greatest ease separate these cohering spheres, and bring them bodily through the film without injury to the one or the other, this is a parallel case to the passage of the nucleus through the capsule of the corpuscle, and of the corpuscle itself through the capillary wall. (Vide figs. 1 and 2, Plate VII.)

I have previously shown that the corpuscles are among themselves amenable to the same laws as the soap-spheres, and we have only to infer that they bear the same relation to the capillary walls as these spheres and films bear to each other. The margin of speculation is therefore small. (Vide Plate VI., figs. 1 and 2.)

In the case of the corpuscles, this relation is of course only seen under abnormal conditions, simply because it is a physical law, which, in the normal working of the animal economy, requires to be antagonised.

It must also be observed that it is only under certain conditions that the soap-spheres attract each other, or are attracted by rigid surfaces or plastic films. This occurs only when free liquid is cohering to their surfaces. If before bringing them into contact we allow the soap-film and sphere to become moderately dry, they will not attract each other, but the former will support the latter as a perfect sphere, instead of drawing it down by progressive cohesion, and arranging it half-way through itself as shown in fig. 1, Plate VII. Compare with fig. 3, Plate VI.

Just so with the corpuscles; they do not unite either with each other or with the capillary wall, unless their normal osmotic relations are disturbed, the exosmotic current setting in excessively, when their external surfaces become coated with content matter, and they become instantly attractive of the capillary wall or glass slide as the case may be.

Suppose, for example, a number of easily moveable bodies, such as cork discs, to be submerged in water, they are neither attractive of each other, nor of the smooth sides of the vessel in which they may be. Both their exteriors and the sides of the vessel are wetted by one and the same liquid, viz., the water, and there is everywhere

a cohesive equilibrium. Precisely the same relation obtains between the blood corpuscles and the capillary walls in a state of health; they are wetted by and surrounded on all sides by liquor sanguinis, and cohesive equilibrium prevails, a condition practically equivalent to the absence of cohesion altogether. If we modify our experiment by first wetting the cork discs with some liquid which is either (as to cohesion) neutral or antagonistic to water—in other words, not miscible or only imperfectly miscible with it—we destroy the cohesive equilibrium, and the discs cohere to one another and to the sides of the containing vessel. In the case of the corpuscles, the second liquid essential for the production of cohesive inequilibrium exudes by osmosis from their interior, and so soon as it appears upon their exterior, they must cohere to each other and to the capillary wall.

The corpuscles having cohered to the capillary wall, their ease of transmission through this structure is simply a question of the extent to which it possesses “the principle of flow” under the pressure to which it is subjected.

In our experiments conducted in the atmosphere, the bodies may be regarded as surrounded by a neutral medium, and therefore when free liquid is present, we have the necessary condition of cohesive inequilibrium.

In the paper before referred to, “On the Laws concerned in the Aggregation of the Blood Corpuscles,” I have given numerous examples of the operation of progressive cohesive attraction, but in this place I wish to call attention to the demonstration there given of its relation to plane surfaces, and to that end introduce the following quotation:—“In thinking over the probable relations which delicate and plastic films might bear to each other, I was again helped out by the recollection of an observation made some years previously upon fine films of collodion. It was found that if one of these films, while still in the wet condition, was detached from the glass plate upon which it had been formed, it immediately, in opposition to gravity, sprang back to its former situation into contact with the glass plate, precisely as if it were electric. This phenomenon of attraction may be witnessed in a somewhat less energetic degree by simply spreading upon a glass plate a thoroughly wetted piece of thin cambric paper, taking care that the contact is perfect throughout. On separating the paper from the glass to nearly its whole extent, and allowing it to hang down at a right angle from the plate, which is held in the horizontal position, it

will be found to gradually raise itself upwards, and reassume its old position of contact with the surface of the glass plate." (Vide fig. 1, Plate VIII.)

Taking this experiment as a starting point, we will extend the consideration to surfaces of a different character. In the first place, we find that this law continues to operate with great facility in connection with surfaces curved in one direction only, whether the surface used be convex or concave, in both cases the film of paper or collodion applies itself evenly to the surface in the gradual progressive manner before explained.

If, however, for surfaces curved in one direction only we substitute such as are curved in all directions, for example, the outer or convex, or the inner or concave surface of a hollow sphere, we find ourselves confronted with a new set of difficulties; out of which we may evolve the statement, that, for any film to apply itself evenly and regularly to either the convex or concave surface of a sphere under the influence of progressive attraction, it is necessary that the film should be, in several particulars of its constitution, very different from the class of films by means of which we have been able to perform the three preceding experiments.

If, by way of illustration, we apply a film of wetted collodion or fine cambric paper to the sphere, so that one point of the convexity of the latter may come in contact with the centre of the film, the attraction will only succeed in pulling it down to the surface of the sphere at certain points, the intermediate puckered parts not being in contact, and by no possibility can they become applied. From this we see that for the film to be laid down evenly it would be necessary that it should contract in certain parts, that in fact the puckered or surplus material should be taken up. We may say then that any film which can adapt itself to the surface of a spherical body must possess the two-fold quality of facile contraction and expansion, these qualities being controlled in their operation by progressive cohesive attraction. Such a film must be a simple, colloidal, cohesion-membrane in possession of the property of "flow."

If, further, we apply to a sphere a film known to possess facile properties of expansion and contraction under the influence of slight forces, such as progressive cohesive attraction, the first thing seen to occur is cohesion of the film to the sphere at the point of contact, and from this point, as a centre of operation, the film proceeds to apply itself gradually in all directions, so that the sphere becomes coated or covered evenly by it. And this process goes

on until the attraction becomes balanced or fully antagonised by the elasticity of the film, *i.e.* the attraction is only powerful enough to stretch the film to a certain extent, so that if the rigid object be fixed, as is the case with the glass bulb when held immovably, we get a disposition of the film, such as is represented in fig. 4, Plate IX. In other words, a sufficient degree of attachment of the film to the bulb has taken place to stretch the film backward out of its normal plane. If now we push the bulb farther forward, the film still continues to apply itself to its surface, and having reached the equatorial line of the sphere, descends on the opposite hemisphere till the bulb is completely coated. But it will be said the bulb does not then really produce an infraction of the film, but merely attracts it down to its surface, and in so doing stretches it, so that it is in reality a new conformation of the film, and not a breach of its continuity. That this is true to a certain extent there is no doubt, but it is not all the truth, for we may wipe the bulb dry after it has passed through the film without interfering with the continuity of the latter. All that appears to be necessary for these effects to display themselves is, that there should be mutual cohesion between the film and the body passing through it; for if we press against one of these delicate films with a substance which has no cohesion for it, *e.g.* a current of air or a dry soap-sphere, it simply distends the film, neither bursting it nor giving rise to an aperture in it; while in the case of a body to which the film can cohere, it would appear to be easier for the latter to allow the passage of the cohering body than to suffer distension by it, and this because it has under these conditions as great an attraction for the particles of the body as for its own particles. When the cohering body has become perfectly applied to the film, the latter, by the cohesiveness of its own particles, contracts to the greatest degree possible consistent with still maintaining its attachment to the cohering body, and this in spherical shaped bodies leads to a condition of things in which half the body is within and half without the film or wall; * therefore the rest of the process must be accomplished by pressure from within. It is easy to see that the manner or degree

* In Plate V., fig. 3, an excellent illustration of this principle is afforded. A light India-rubber ball or balloon is suspended from a fixed point *a*, its surface having been previously wetted over with a solution of soap. When a soap-film formed upon the ring, as in the previous experiments,

in which the corpuscle or body adheres to the film will determine very materially the method of its transmission. All then that is essential for a rigid or a plastic body to pass through a colloid film is, (1) an intimate power of cohesion either mediately or immediately between the film and the body; (2) a certain amount of pressure from within; (3) power in the substance of the film to cohere to the surface of the body, or to some intermediate matter which already coheres to its surface, during its passage; (4) cohesive plasticity of the particles of the material of which the film itself is formed, so that the breach in it may become reunited as it descends upon the opposite surface of the body which is being extruded.

It is quite remarkable to how great an extent these conditions appear to be complied with in the passage of the corpuscle through the capillary wall, as affirmed by independent observers.

In the factitious examples by which I have sought to illustrate these effects, the film moves over the body, or the body through the film, by virtue of the intermediate agency of the solution which has cohesive attraction for both; and the film does not rupture, because, while the body is travelling through, it can continue to cohere until it is brought again into contact with its own particles at the opposite pole of the extruded body.

Theoretically, it should leave the sphere or protruding body as represented in Plate IX., fig. 1, having gradually narrowed the aperture to absolute union at a focal point, or, according to the laying-down view, having re-peeled itself from the bulb. Practically, however, I find that the film rarely leaves the bulb or sphere, without forming on it a small hemispherical bubble, which is large in the ratio of the rapidity with which the detachment is effected. (Vide Plate IX., fig. 3.)

If detached with very great care the bubble is exceedingly small, but I could not succeed with a spherical bulb in getting rid of it altogether. With a more conical bulb, however, this was readily effected. In the case of the sphere, the film is in reality

is brought into contact with one part of its convexity, the ball is at once drawn into the film as far as its equator, and is compelled to retain this position in opposition to the force of gravity. This is the exact converse of the case of the fixed bulb, in which the attraction is satisfied at the expense of the extensibility of the film.

drawn out into a little neck, as in the other examples in which continuity is effected, and this neck being pulled into two, and both parts cohering at the point of severance, we get on the one side the perfected film, and on the other a small enclosure of air which takes on the hemispherical form. This is owing to the annular contraction of the tubular part. If the body were small, or less spherical, or the film a trifle more rigid, this would not occur. (Vide Plate IX., fig. 2.)

I find in fact by experiment that smaller bodies, more conical in their termination, will not do this, but draw out a kind of streak of solution as they leave the film; a fact I have often observed with the white corpuscles. In this case the film is brought to a focus upon the body, and not at a slight distance from it, so that either or both these modes might obtain with the corpuscle. In some cases the streak of solution is absent. The method of sealing which leaves behind a portion of the film is probably a necessity of every case of repair of continuity, with the exception of that of transmission of a foreign body through a film.

In the case of the blood corpuscle it would not appear that the capillary wall became applied over the surface of the corpuscle to any great extent, but that, having effected cohesion, it becomes easier for the capillary wall to give way and glide over the corpuscle than to be distended by it. And this is effected much more slowly than in the case of the factitious examples which I have given; the content matter of the corpuscle abnormally present upon its surface being, as before stated, the material through the medium of which the cohesion is effected.

THE RELATION OF EXTRUDED BLOOD CORPUSCLES TO PUS AND TO THE SO-CALLED FIBRINOUS EXUDATION OF INFLAMMATION.

The white blood corpuscle, the discovery of which was claimed by Mandl in 1838, but which in truth had been observed at a much earlier period by our countryman Hewson, has always been an anatomical element of great interest both to the physiologist and pathologist. To the former, mainly on account of its assumed progenital relationship to the red corpuscle, and its curious property of exhibiting spontaneous or amœboid movement. To the latter, on account of the singular similitude which it bears to the morphological element of pus, which has been termed the "blood of

pathology." As before seen, the two latter mentioned properties are those which constitute its interest in the present connection.

The analogy between the pale corpuscle and the pus cell is so complete as to render it impossible to differentiate one from the other. When Dr. Hughes Bennett observed his first case of leucocythemia, which we now all know consists in an enormous increase of the colourless corpuscles of the blood, he considered that he had under his eye innumerable pus cells, and was led to designate the affection, "suppuration of the blood without inflammation." It must be borne in mind that the attention of pathologists was much directed toward the subjects of pyæmia and inflammation, and that Addison and Williams had published their conviction that the cause of inflammation was an increase of the colourless corpuscles. Piorry also supposed that the blood itself was capable of becoming inflamed, and that this constituted pyæmia. It is not at all surprising, therefore, that Bennett, under the influence of these views, seeing what he believed to be a multitude of pus cells in the blood without any febrile or inflammatory co-existences or sequences, was induced to characterise the disease in the manner just mentioned. At the same time it must be admitted that he did not entirely overlook the possibility of these cells being the colourless corpuscles of the blood, for he said, "the blood in a state of health contains a number of colourless corpuscles which closely resemble those of pus."

Six weeks after the publication of this case by Bennett, a similar one was observed by Virchow of Berlin, and he gave to the disease the name of Leukæmia, and subsequently that of Leucocytosis.

Bennett has all along affirmed that there is no real difference between the colourless cells which he observed in 1845 in such numbers, and the pus cell; and Virchow, on page 155, "Cellular Pathology," published 1860, says, "A pus corpuscle can be distinguished from a colourless blood cell by nothing else than by its mode of origin. If you do not know whence it has come, you cannot say what it is, you may conceive the greatest doubt whether you are to regard a body of the kind as a pus or a colourless blood corpuscle. In every case of the sort the points to be considered are, where the body belongs to, and where its home is. If this proves to be external to the blood, you may safely conclude that it is pus; but if this is not the case, you have to do with blood cells."

Bennett very strongly, and with good reason, objects to this

definition of Virchow. "According to this definition," he says, "a cell closely resembling a pus cell in the saliva, inasmuch as it originates externally to the blood, is a pus and not a salivary cell. On the other hand, if a blood vessel be full of a thick, creamy, yellow fluid, containing a multitude of cells indistinguishable from pus cells, inasmuch as these are formed in the blood it is not pus. According to Professor Virchow, practical men in future, when they see in a case of puerperal phlebitis, the uterine sinuses and neighbouring veins distended with pus, or surgeons, when they see the veins of the arm full of purulent matter from the bend of the elbow to the axilla, are to conclude that it is not pus. I maintain on the contrary that such fluid is pus, because it results from inflammation; that is the real question to be considered."*

From what has been said it will be seen that Bennett, Virchow, Waller, Cohnheim, and others, regard the white corpuscle as identical with the pus cell; that the two latter would consider it a pus cell if they found it outside the proper blood channels; and that the former (Bennett) would do so only if its presence in a part had been contingent upon inflammation.

I have attempted to show in the early part of this paper that cell extrusion never takes place except under conditions in which the white corpuscles exhibit adhesiveness, and I have further sought to bring out that this adhesiveness is the initial visible sign of inflammation, or of the operation of irritation.†

If this be correct, it will be apparent that while the view of Virchow would not compel him to accept extruded white blood corpuscles as pus-cells, the converse would be true of Bennett, because the very act of extrusion is the result of inflammatory change. The statement of Virchow amounts simply to this:—If you see a body like a white blood cell, and you can make out satisfactorily that it is a derivation of connective tissue or epithelial structure, then you may affirm that it is a pus cell; but if, on the contrary, you can show that it has escaped from the blood, then it is a white blood cell. This is, after all, a question of designations. The real question at issue is, whether, under a certain degree of irritation, numbers of white blood cells can accumulate in the vessels of a part and become extruded through the vessel walls, and in their new habitat, surrounded by exudation fluid, commence a process of

* Vide "Lancet," 1863, p. 380.

† Vide foot-notes, pages 246 and 249.

multiplication, and so constitute some of those swellings which we call abscesses.

That such is the case there seems to be the strongest presumptive evidence, and such a view by no means ignores the possibility that other formations of pus may be due to the proliferation of connective tissue and epithelial cells. Indeed, there is the strongest probability that the *large* white blood corpuscle itself is nothing more than the nucleus derived from the epithelial lining of the lymphatic and vascular tract; and if this prove true, there is not the slightest reason why it should not be regarded as endowed with the properties of epithelial nuclei in general. That is to say, if abnormal conditions (irritation) can excite increased proliferation in connective tissue and epithelial nuclei, it may be expected confidently to do the same in the white blood cell. Bear in mind there is no denying the fact that, in all cases of inflammation, white corpuscles do escape in large numbers from the vessels, and therefore some of the contents of an abscess are undoubtedly such white corpuscles; consequently we must affirm that *some* of the white cells in a common abscess are undoubtedly blood cells.

It remains to refer to one other writer upon this subject, one whose opinion, on account of his vast histological knowledge, is entitled to be received on such a question with the profoundest respect; I allude to Dr. Lionel Beale. He says:—"Cohnheim has discovered the remarkable and interesting fact, that, in the living frog, white corpuscles may be seen to pass through the walls of the blood vessels, and has arrived at the conclusion that the corpuscles in their new situation are pus corpuscles. But it is difficult to understand how, by the mere passage through membrane, so great a change as is supposed can be effected; for a white blood corpuscle is one thing, and a pus corpuscle another. Suppose the pus corpuscle to pass back again into the vessel, does it remain a pus corpuscle, or is it again converted into a white blood corpuscle? But the idea of a true pus corpuscle becoming a white blood corpuscle cannot be entertained. It would be as unreasonable to maintain that it might become a brain cell. It seems to me that in this view there is a confusion of things quite distinct from one another. A pus corpuscle is as far removed from a white blood corpuscle as it is from a healthy epithelial or other cell. If it be said a white blood corpuscle looks like a pus corpuscle, I would answer, 'No two forms of germinal matter, however much they may differ in origin, properties, or

powers, can be distinguished from one another by their microscopical or chemical characters. We could not distinguish the germinal matter of the lowest, simplest living thing from that of the highest brain cell of man. They differ in power and in action, although the material composing the one resembles in appearance that which constitutes the other.' . . . In all cases true pus corpuscles are the descendants of normal germinal matter, and result from its increase and multiplication at a greater rate than occurs in health. If the living germinal matter of any tissue, or that composing white blood, lymph, or chyle corpuscles, receives an increased supply of pabulum, it will grow, divide, and subdivide, and at a gradually increasing rate if the conditions be favourable. The masses resulting from this process acquire properties and powers very different from those of the originals. Hence, although a white blood corpuscle growing and multiplying under altered conditions may give rise to multitudes of pus corpuscles, nothing can, I think, convert an individual white blood corpuscle into a pus corpuscle, and it is quite certain that under no circumstances whatever can pus corpuscles undergo conversion into, or give origin to, white corpuscles. We might as well proceed to discuss whether a new and highly elaborate structure, with vessels, nerves, and special anatomical elements, could be formed from the contents of an abscess."*

I submit that Professor Beale has mistaken the position of the advocates of this view of pus formation. They maintain that no morphological or chemical difference exists between the white corpuscle and the pus cell, and therefore, so far from affirming that any change in the nature of the cell takes place during the passage through the wall of the capillary, such change would be fatal to their theory. The simple change of place warrants in their estimation the change of name; the designations are in fact convertible. In fine, they affirm that the same anatomical element has been hitherto variously denominated a white blood cell, or a pus cell, according to the locality in which it has chanced to be discovered; and further, had the possibility of the extrusion of the white blood corpuscles into the tissues been known from the beginning, the designation "pus cell" would never have been needed or invented.

It is true that Dr. Beale affirms that there is some essential difference between the white blood corpuscle and the pus cell, but

* "Medical Times and Gazette," May 9th, 1868.

it must be confessed that the evidence in favour of this is not at all satisfactory. He conceives it quite possible for white blood corpuscles, under altered circumstances of nutrition, to give rise to pus corpuscles, but such corpuscles he would regard as degenerated offspring, and therefore quite incapable of reproducing structures in all respects similar to their original progenitors. Thus he assumes a difference, and at the same time admits the impossibility of demonstrating its existence; for if we can find no morphological or chemical difference, and are compelled to take as our guide "the differences in power and action" which distinguish various other indistinguishable forms of germinal matter, what shall we find? Why, that waiving the dubious doctrine of the origin of the red corpuscle from the white, no property or power can with certainty be ascribed to the white blood cell, but which is as certainly predicable of the pus cell.

(1) As anatomical elements they offer no points of distinction.

(2) Their chemistry is the same.

(3) Both possess amoeboid powers.

(4) To both is accorded the property of growth and multiplication by subdivision.

(5) Neither of them contribute to the formation of any higher structure.

(6) Neither of them eventuate in anything different from cells, or as Beale would say, masses of germinal matter, but as such live, die, and disintegrate.

If any evidence were needed that tissues possess within themselves their own life properties and powers, no better exemplification of the fact could be found than in the recent success which has attended the transplantation of minute detached portions of skin. It is quite clear that the conglomerate tissues which form these little pieces of skin possess the property directly to absorb from the surfaces upon which they are placed the elements of their nutrition, and to convert them into their like.

It is now some years ago since Virchow urged the importance of recognising the fact, that the individual elements of tissues, when incited by a stimulus directly applied to them, had the power of taking up an increased quantity of material quite independently of any vascular or nervous change. These views that learned pathologist enforced by examples derived from articular cartilage and the cornea. He showed that if a thread were passed through a cartilage, the primary visible effect was an enlargement of the cells around

the thread and in its tract, whilst the more remote cells remained unaffected. A condition was thus induced which, as the result of irritation, according to this author, could not be distinguished from simple hypertrophy, and this brought about those modern ideas of inflammation which may be briefly expressed thus:—"The direct irritation of tissue elements leads in the first place to increased absorption and consequent enlargement of these elements, and subsequently to heterologous proliferation of the nuclei in the shape of pus." Any changes which may occur in the blood or vessels are regarded as entirely secondary and subordinate. In this way those important changes in the blood, such as stasis and exudation, have been reduced to so subordinate a position that it is almost the fashion now-a-days to ignore them altogether. Against this tendency, I think, a stand requires to be made. These teachings of the great pathologist embody but a portion of the truth, and are incompetent to the explanation of the phenomena of inflammation as they occur in compound tissues and organs, in which the effects of direct irritation are various and complex, and re-act upon each other in the production of still more complex results. Space will not permit me to state my views upon this question, save in the most epitomised form, and I will therefore embody them in a series of propositions.

(1) It must be admitted that every tissue of the organism possesses, as an inherent quality, the power to absorb such material as it requires for its growth.

(2) This nutritive material is absorbed in the shape of solution of organic materials supplied by the blood.

(3) This capacity of the tissues to absorb liquid matter in their vicinity involves a constant supply, which is emitted laterally by the blood vessels, and which fills up the capillary interstices of the tissues. This may be called the normal exudation stream, the motive force of which is the growing and developing tissue.

(4) When, as a sequence of direct irritation, the tissue elements absorb more freely than *usual* the liquid in which they are bathed, the result is that the normal exudation stream is increased in its rate of flow, until a balance is attained between the power of the tissue elements to absorb on the one hand, and the capacity for lateral exudation in the vessels on the other. That is to say, a mean is attained between demand and supply.

(5) These simple principles hold good in all nerveless and non-vascular structures, such as the cornea and cartilage, but the case is

utterly different when a part irritated contains, in addition to the simpler ordinary tissue elements, blood vessels and nerves, for these structures are simultaneously subjected to irritation, and you get superadded to the effects which flow from simple cell-tissue irritation, such results as irritation may be capable of effecting directly or indirectly in the tissue elements of and in the functions of blood vessels, blood corpuscles, blood plasma, and nerves, together with their sequences.

Let us take for example a tract of the skin—one of the first results of irritation of such a compound structure is pain; *ergo*, sensory nerve elements have been excited. Simultaneously we get momentary pallor, succeeded by increased redness. Microscopic investigation of transparent parts teaches us that this pallor corresponds to contraction of the blood vessels, and the increased redness to dilatation of the same, the result of vaso-motor fatigue, or, in cases of excessive irritation, paralysis. If the irritation is very severe, we may get in addition intrinsic muscular paralysis.* Here we have the function of two important tissues thrown into abeyance.

(6) In the case of the skin we have also direct irritation of connective tissue elements, leading to increased absorption of liquid in the vicinity, and therefore to an increase of the normal exudation stream, which is now no longer, as in the case of the cartilage, antagonised by the normal contraction of distant blood vessels. It is this increased normal exudation stream which I have designated the “primary exudation.” The extent or rate of the primary exudation will determine the several sequences which may occur.

If but little over the normal nutritive ratio, there will be but little inspissation of the liquor sanguinis, the first visible result of this being the display of adhesiveness in the white corpuscles; and if the irritation is not unduly severe, and the primary exudation consequently moderate, the vessels will become lined and even filled with white corpuscles, and a condition attained which, when displayed in greatest perfection, may be designated “white stasis.” For the production of this form of stasis, a degree of irritation just short of that which induces cohesiveness of the red corpuscles is necessary, because it depends upon the white corpuscles becom-

* Muscular tissue appears to be capable of maintaining, even in the absence of nerve, a certain degree of *tone*.

ing cohesive, while the red are as yet scarcely affected in this respect; so that practically the white corpuscles become filtered out from the red, and left behind in the vessels by virtue of their tendency to adhere to one another and to the vessel walls. It is therefore in long continued irritation of an intensity insufficient to induce cohesiveness of the red corpuscles that we get greatest extrusion of the white blood cells, and consequently in which we should be likely to get formation of pus in this manner to the greatest extent.

On the other hand, if the irritation is more severe, and the primary or lateral exudation correspondingly excessive, the vessels are robbed of their liquid matter at a greater rate than it is supplied. Red corpuscles lag behind and numerically increase. At the same time, when the inspissation attains a given degree, they become cohesive, blend together, block up the vessels, and exhibit the condition which, in contradistinction to the former kind, may be designated "red stasis." It is at this juncture when stasis (white or red) has occurred, that the secondary exudation comes into existence as the result of pressure. The course of the blood being arrested, there is nothing left save for its liquid portions to stream out laterally, while the pressure exerted on the blocked portions drives through the walls of the capillaries the red or white corpuscular matter as the case may be. (Vide Plate X., figs. 1 and 2.)

This extruded corpuscular matter being fibrino-plastic in its character, unites with the fibrinogen of the liquor sanguinis simultaneously exuded, and forms upon the walls of the vessels and contiguous parts that inflammatory product so long recognised as the coagulable lymph of Hunter, but erroneously regarded as a fibrinous exudation from the blood. While it is quite true that this product is fibrine, there is no proof that it ever existed as such in the blood; on the contrary, there is the strongest evidence that it is formed at the period when the corpuscular matter is forced in such quantities through the walls of the vascular parietes during the condition of stasis.

This view is in accordance with the recent researches of Professor Heynsius, which demonstrate that the great bulk of the substance known as fibrino is derived from the content matter of the corpuscles (fibrino-plastin).

These facts taken together furnish us at once with an explanation of the source of the fibrinous deposits which result from in-

flammatory action. The tint of the exuded lymph is well known to be very variable, and this is accounted for by the varying amount of cruorin present. If the form of stasis which obtains be due to the blocking up of the vessels with white cells, the globulin extruded will give rise to a pure white form of coagulable lymph. If, on the contrary, red stasis prevails, the lymph will be of a reddish colour, and between these extremes we may have yellow green, or in fact any shade of colour capable of being imparted by cruorin in a dilute or concentrated state, so that the colour of the lymph, being dependent on the mixed character of the stasis, is really an indication of the intensity of the irritation which has existed.

ON APOPLEXY, AND THE VALUE OF THE ABSTRACTION OF BLOOD IN ITS TREATMENT.

BY THOMAS BALLARD, M.D.

It can but appear to be presumptuous on my part to attempt to contravert the views of eminent members of our profession, which have long been accepted and now dominate the practice of the majority; but such is my present purpose, and my excuse for so doing must be the vast importance of the subject, and my strong conviction that the practice which is now usually pursued in certain cases is not that most conducive to the benefit of the patient.

It must be a matter of the greatest importance to a family, whether, when an infant or a child is assailed by an illness the consequence of some not easily appreciable cause, its life, a sense, or the function of a limb or limbs be sacrificed, or, by a simple remedial application it be quickly restored to perfect health; or whether a son or daughter in the bloom of youth should die or be crippled by an illness the result of excessive study or the exertion of recreation, or, by the aid of judicious treatment should speedily recover, or that the life, senses, or power of limb should be saved to a parent if possible.

My conviction is, that following the present teaching the cases of brain disorder which so frequently occur to persons of both sexes and all ages—and are variously considered to be congestion of the brain, cerebral hæmorrhage, meningitis, embolism, gout in the head, congestion of the liver, biliousness, teething, irritation from worms in the intestines, &c., according to the more or less prominence of certain symptoms or the bent of the physician's mind—have not the advantage of that treatment which affords them the best chance of complete recovery.

I propose for my present purpose to designate all such cases, "Apoplexy." My justification for this general use of the term is, that it involves no particular pathological condition, but has reference especially to the symptoms—viz., abolition of senses and power

of movement—which symptoms are either present or threatened in all the cases to which I now propose to refer. My object is to invite attention to the fact that all recent teaching and writing in reference to the treatment of these affections discourages or denounces “abstraction of blood” as a remedy; and, with the hope of encouraging a reconsideration of this subject in the minds of some, to submit some arguments and facts in favour of the use of this remedy, which seems to exceed all others in efficacy. In the majority of cases it is the only one needed; if resorted to early enough it seems to be almost infallible, and if delayed until the case seems hopeless it can do no harm, but may sometimes surprise the physician by its miraculous effects. I know of no objection to its judicious employment at any period of life. It is in great disfavour at present both with the profession and the public, and it is necessary to have considerable confidence in its beneficial powers to insist upon employing it.

I believe I am correct in saying that all recent medical writers of eminence denounce this remedy. Trousseau, in arguing against it, expresses his doubt whether there is such a condition as cerebral congestion, and as regards cerebral hæmorrhage, he urges that “inasmuch as the hæmorrhage is an accomplished fact when we are called upon to note its symptoms the blood-letting can be of no avail, especially as we have no experience of its being useful in other ecchymoses.” He further says, “What treatment then do I adopt in cases of cerebral hæmorrhage, and more generally in apoplexy? Instead of bleeding my patients, of putting them on low diet, and keeping them in bed, I do not draw blood from them, I recommend them to get up if possible, at least to remain in the sitting posture, and I feed them.” In reference to the treatment of infantile convulsions, he says, “Our treatment should be expectant; perturbing measures, such as bleeding, leeches, pretended revulsives to the skin, are always dangerous and almost never useful.” Sir William Jenner, in his address delivered to the British Medical Association at Leeds, took the opportunity to illustrate the advance of medical knowledge by denouncing the practice of blood-letting in apoplexy as an exhibition of ignorance of the pathology of the disease. In allusion to the case he quoted he says, “The only treatment to be adopted was as follows. To place the patient in the recumbent position, with the head and shoulders raised; to enforce absolute rest, to keep the bowels so far loose as to prevent straining and excitement, to apply cooling substances to

the head in the event of any heat of the part occurring; to support the patient with light nutritive food, having regard to his habits." Dr. Hughlings Jackson, in his article "Apoplexy," in Dr. Russell Reynolds' System of Medicine, says, "Sometimes the first symptoms of cerebral hæmorrhage are vomiting and headache, without any local palsy. These two symptoms setting in suddenly, especially if they do not occur in getting up in the morning, but come on without any obvious provocation, should always lead to a careful consideration of the possibility of a cerebral hæmorrhage having happened." With this I quite agree, and it is under these circumstances that I would advise the abstraction of some blood in addition to the other remedies which Dr. Jackson advises. He proceeds to say, "The great thing to do for a patient who may have a small effusion of blood upon the brain is to *keep him quiet*, in the hope that the clot will not get bigger, and when, from the appearance of decided confusion and weakness of one side, we feel that it is almost certain that a large clot is already lying in the floor of one lateral ventricle, we must adopt the *same plan* in the hope that it will not increase in size and break into the ventricle." These quotations show how thoroughly the writers and teachers of medicine of the present day disregard and discourage the employment of blood-letting in cases of apoplexy.

I cannot agree in opinion with those who maintain that blood-letting cannot promote the absorption of blood effused upon the brain. We know that one of the principal effects of the abstraction of blood is to promote the absorption of effused fluids derived from the blood, and if so, why not of the blood itself; especially when we bear in mind that although it is a clot we are accustomed to see when we make the post-mortem examination, yet the effusion is of fluid blood during life, and therefore in a fit state to be absorbed? It is said we have no experience of blood-letting being useful in other ecchymoses, certainly we do not always employ it for this purpose because blood extravasated under the skin is not dangerous, and we know it will be absorbed in due time; but it is not unlikely that bleeding would hasten the process, and some surgeons do now advise leeches to injured parts when there is much ecchymosis, with this object.

We cannot inspect the brain of a living patient, and therefore we are left very much to conjecture what is its pathological condition. Trousseau tells us, "that during the first years of his practice, he saw, or thought he saw, a pretty large number of

cases of apoplectiform congestion, but for a long time past he had not seen any, yet other medical men had seen as many as before." Recently, the theory of embolism has taken possession of the medical mind, and it is now usual to attribute attacks of apoplexy to the plugging of a cerebral artery. The practice deduced from this theory is, of course, quite opposed to that of abstracting blood. Cases in which I have felt interested have been so interpreted by high medical authority, when to my mind they would have been more satisfactorily explained as cases of cerebral hæmorrhage, and best treated by the abstraction of some blood. Again, gout in the head is a not uncommon mode of accounting for symptoms which threaten death or paralysis, and which can be quickly and effectually relieved by a moderate abstraction of blood, but on account of the theory of their causation, this mode of treatment is contra-indicated.

Another theory of the cause of brain disease, which I think is fallacious and very mischievous, is that of biliousness—a term in common use both in and out of the profession, as if it were a definite and well-understood condition. However, it is one I confess I have never been able to apprehend. The idea seems to be based upon a set of symptoms of which one would think the most simple reasoning would have given another explanation. No fact is more obvious to any one who has had any medical experience than that of vomiting being a symptom of a certain stage of injury or disease of the brain; it usually occurs when the brain is injured by accident, and is almost invariably one of the first symptoms of the accession of disease in that organ.

A person suffers headache, giddiness, and vomiting; he rejects all the food that his stomach contains, and then, by the continuance of the efforts, the contents of the gall-bladder are ejected. The bile is recognised by its green or yellow colour and bitter taste as something differing from the usual contents of the stomach, and to its presence is attributed all the evil, thus making the last link of a chain of phenomena accountable for a movement which began at the other end. I have carefully watched the progress of cases of jaundice, both of a temporary and permanent kind, where the tissues have been deeply stained for various periods of days, weeks, or months, and have not found that the subjects of this disorder have suffered with headache, giddiness, and vomiting; but surely these cases must realise the idea which the term "biliousness" would seem to convey to the mind.

Again, an infant or a child is attacked with vomiting and drowsiness, and probably with headache also, but may not be able to express it. The symptoms are referred to "inaction of the liver," or to its having eaten a piece of cake or pudding. A fit is very likely to succeed. Should it occur in the day time it will be observed by the nurse or parents; but if during the night it may escape observation, and a paralysis may be the only symptom which subsequently attracts the attention. In such cases it is usual to explain the malady by attributing it to one of the above supposed causes, or to the growth of the teeth, or the imaginary presence of some worms in the intestines. I have carefully observed and noted a great many of these cases, and never have I happened to meet with the concurrence of the worms and the fits. As to the growth of the teeth being a cause of such ailments, I am at a loss to understand how any one who ever devoted any observation and reflection to the subject could have arrived at such a conclusion.

I have made the above remarks advisedly, feeling sure that the following relation of cases will support them, together with the substance of my proposition in general, which is briefly:—That we may usefully include under the term "apoplexy" several kinds of fits and seizures which occur at all periods of life, and are ushered in by headache, giddiness, and vomiting; that these cases are best treated by a judicious abstraction of blood; that the neglect of adopting this remedy at a sufficiently early period of the illness has resulted in some cases in the death of the patient and in others in various forms of palsy; and that this remedy may be usefully employed for the same symptoms at any period of life. I have said nothing of epilepsy, but my cases lead me to the conclusion that by treating the head symptoms of early life by bleeding, this dreadful malady is nipped in the bud, and that even in an adult a cure may be effected sometimes.

I proceed to quote the particulars of some cases of the character I have endeavoured to describe, which have come under my own observation, and I flatter myself that the testimony which they bear in favour of the abstraction of blood as an important remedy will be admitted to be of some weight. I have selected them from my own records, including persons of both sexes and of all ages, from six weeks to eighty-two years, commencing with the youngest.

Case 1.—Persistent vomiting and stupor in an infant six weeks old; speedy and complete recovery after leeching.

An infant, born October 25th, 1867, was very ill during the first week of the following December. On the 5th it vomited frequently, on the 6th the vomiting was incessant and there was stupor. Its death seemed inevitable. I was prevented by illness from attending; but it was assumed that, had I been present, I should have prescribed blood-letting. A leech was therefore applied to the temple; no other remedy was required, and recovery was perfect. He is now a strong, healthy child, three and a half years of age.

I contrast this case with the following one, in which blood-letting was not employed. I have no doubt that the cause of the illness was the same in both cases, but into this I do not now enter. The essential illness in both was a brain disease. In one it was cut short and cured; in the other the real disorder persisted, in spite of the prominent symptoms being relieved, as it was thought at the time, effectually.

Case 2.—Persistent convulsions in an infant six weeks old, treated by chloroform, resulting in mental deficiency and permanent epilepsy.

An infant, born January 17th, 1853, was, when six weeks old, submitted to my notice in consultation. She was considered by all around her to be beyond hope of recovery, having been in a state of stupor and convulsions for four days previous to my visit. I spent a great portion of the night keeping her under the influence of chloroform, which certainly calmed the convulsions, I presume by increasing the stupor. Other directions were given as to the feeding as in the other case. The use of the chloroform was continued by the nurse for six weeks afterwards, and its beneficial effects were regarded as very satisfactory by all concerned. The young lady is still alive, in the nineteenth year of her age. She is a permanent epileptic, and mentally very deficient. She is short in stature, but otherwise well developed physically.

The next cases are of children a few months older, in whom the same train of symptoms have occurred, viz., vomiting and drowsiness, or stupor preceding coma and convulsions. Those treated by bleeding recovered quickly; where bleeding was neglected, or too long deferred, death was the result.

Case 3.—Vomiting and stupor in an infant eight months old; abstraction of blood by leeches, followed by immediate recovery.

On February 17th, 1871, an infant aged eight months was brought to me from the country, having been very ill for a fortnight, in consequence, as was alleged, of being about to cut

eight teeth. The history of the illness was not very clear; but I ascertained that on the 14th she had vomited several times. I was anxiously watching the symptoms, when I found that she vomited twice on the 19th. On the 20th she vomited in the morning, and was dull and sleepy all day, refusing to take any food. At night I had her roused and fed with some milk and water. This she immediately rejected by vomiting. Temp. 104. Two leeches were applied to the temple.

21st. 9 a.m.—No more vomiting, has passed a quiet night. Temp. 98. Takes food, is awake and intelligent.

9 p.m.—Has again vomited violently several times, is now semi-comatose, very pale. Pulse 140; temp. 103. Two more leeches applied to the temple.

22nd. 9 a.m.—No more vomiting, is awake and intelligent. Temp. 101.

9 p.m.—Is awake and lively, taking plenty of food. Temp. 97.

She recovered from this moment, requiring no other treatment, and is now a year old, very strong, healthy, and intelligent.

The following illustrates what I have advanced respecting the prevalence of erroneous views as to the cause of these cases, as well as the decided benefit derivable from the plan of treatment I am now advocating. I quote the exact words in which the case was brought under my notice, as they so well and truthfully depict it.

Case 4.—Vomiting and stupor in a child nine months old, attributed to biliousness, immediately cured by leeching.

On June 27th, 1866, a lady wrote me as follows from the seaside:—"The heat here has been very great the last few days, and baby has been extremely well and jolly until yesterday morning, when I found she had been restless all night, had been very sick, and afterwards had a very loose stool, and seemed quite prostrated. As she continued to be very sick and unable to keep anything down, I sent for a medical man to tell us what was the matter. He said, on looking at the motion, that it was diarrhoea, and that the milk was too heavy. She was then given chicken broth and biscuit and water; but she kept nothing down, and was quite unable to sit up or take notice of anything. She became burning hot, and had she not been far too ill I should have sent her off to you. Twenty drops of brandy in water was prescribed. This morning she had some biscuit and milk for breakfast, but brought it all up. She lay still on the bed all day until six p.m.,

when she seemed quite herself again. I am quite easy about her to-night: she has been sound asleep since seven."

I replied that I had no advice to offer, as I presumed the baby was better.

On the 28th she writes—"Thanks for your letter. I wish I could say baby was well. She is full of bile, and very sick at stomach. She slept well, but brought up all she took in the night. We gave her the brandy again. I sent for the doctor again this morning. He is not at all uneasy about her. He says 'she has congestion of the liver, and nature is bringing off the bile and may be some time about it.' If we could stop the sickness we should get on. I need not say how anxious I am; more so, perhaps, than I ought to be, for the doctor assures me she will get rid of the sickness as the bile goes."

This account so satisfied me that the baby would soon become comatose, and probably beyond the reach of remedies, that I started as soon as I could to visit her. I found her very pale, prostrate, and dull, but not insensible. I administered some milk and water, which was speedily rejected from the stomach with force. This decided me as to the course to pursue. I sought the gentleman who had been called in, and explained my view of the case, viz., that the baby was suffering with apoplexy, and that unless some blood was taken, she would soon become insensible and beyond the reach of remedies. He objected to my view, appealed to his own large experience, and wished to rely upon the administration of calomel. We, at length, effected a compromise that both our plans should be tried, but I insisted on mine preceding his; I undertaking to apply the leeches and to take the whole of the responsibility of using them. In fact, I promised not to return to town until the case assumed a different aspect. Two leeches were applied that night to the temple, they bled well. The baby slept all night, and on going to the nursery the next morning, she was sitting up taking her breakfast of rusk and milk with appetite. She had no more sickness, took no more medicine, and has had no illness since. She is now in the sixth year of her age, a well grown, strong, healthy, and highly intelligent child.

I quote the following case as a contrast to the preceding one, it well illustrates the fatal consequences of deferring the employment of blood-letting.

Case 5.—Symptoms exactly corresponding with those in Case 4, bleeding deferred, supervention of coma, convulsions, and death.

In May, 1865, a little boy, aged eleven months, was the subject of vomiting and stupor. I wished to apply leeches, but there was an objection, and I was induced to abstain from insisting on their use. Having explained my views, I agreed to defer the bleeding until another attack of vomiting occurred. I think that I was subsequently deceived, for I could not again get an act of vomiting confessed to by the nurse. The child remained for a few days dull and drowsy, then an attack of convulsions occurred, which was succeeded by profound coma and death in a few days.

The next case illustrates the objection which prevails against blood-letting, and the startling effects which may be realised by a bold employment of the remedy in a case which appears hopeless.

Case 6.—Sudden and severe apoplexy in a child two and a half years old, failure of other remedies, immediate cure by a free bleeding from the external jugular vein.

I was summoned on November 9th, 1859, to see a little girl, æt. two and a half. She had seemed to be well and merry on the previous day and until nine this morning, when she vomited and became pale; the vomiting recurred several times, and was succeeded by insensibility and convulsions. I reached her at 11.15; she was then quite insensible, with stertorous breathing, convulsive movements of the right arm, and paralysis of the left. Two medical practitioners had been summoned previous to my arrival. They had lanced her gums, and had administered a turpentine enema, besides calomel, magnesia, sal volatile, and brandy by the mouth, and at the moment of my arrival were submitting her to the inhalation of chloroform. I had procured some leeches on my way, and was anxious to apply them; but both gentlemen objected strongly. On my persisting in my opinion they decided to retire and leave the case in my hands, she being really my patient. They both accompanied the mother down-stairs, leaving me alone with the child. I was impatient that the leeches did not fasten quickly, and was fearful of delaying longer the use of the only remedy I was convinced could save her life. I therefore at once opened the right external jugular vein and abstracted four ounces of blood. Within two minutes of my having closed the wound she opened her eyes and looked at me. In five minutes more she sat up and held a tea-cup to drink from. From this time she gradually recovered; the left arm was certainly paralysed for several hours, but appeared to have recovered its power by the next day. No other treatment was required, and she ran alone for the first time that day week.

Case 7.—Acute attack of threatened apoplexy, cured by leeching.

A lively, intelligent little girl, aged three years, said to her nurse one morning in June, 1869, "Dolly has hit my head." She then became drowsy, and appeared ill during the day. I saw her at five p.m.; she was then pale and prostrate in bed, not liking to be moved; she had vomited several times. I visited her again at ten p.m. She was still unable to sit up, and the vomiting had continued. Four leeches were then applied to her temple. The vomiting recurred a few times until four a.m., when she fell asleep. On paying my visit the next morning she ran into the hall to meet me, and seemed as well and merry as I ever saw her. She has continued quite well ever since.

The next two cases show how epilepsy may be cured, if it be treated by the persistent employment of blood-letting in early life, when this dreadful malady is taking root in the brain of the individual.

Case 8.—Recurrence of epileptic fits during eight months, quite cured by repeated application of leeches.

March 17th, 1866, I saw a little girl, æt. fifteen months, who was said to have had epileptic fits for the past seven months, unattended by vomiting. She is first very fidgetty and cross, and then becomes insensible for a time. Two months ago she had three in one day. She had one the day before yesterday, four yesterday, and one this morning. To apply two leeches to the temple.

April 13th.—Has remained quite well until this morning. She was very well last evening, but was restless in the night, and at seven a.m. went off into a fit. Two leeches were applied. At one p.m. she appeared very well; a quarter of an hour after she again had a fit. At five p.m. she suddenly uttered a loud scream and again went off into a fit. She remained dull and insensible for half an hour. Two more leeches were applied.

14th.—Had another fit at three a.m. A blister was applied to the neck. Since then she has not had a fit, nor required any further medical treatment, and is now a strong, well grown child of six years of age.

Case 9.—Persistent epileptic fits in a young child, cured by repeated application of leeches.

In November, 1862, I took charge of a little girl aged one year. She was then suffering with frequent attacks of fits of an epileptic character and laryngismus stridulus. The fits recurred more or

less frequently during the next fifteen months. She was treated by repeated application of leeches to her temples. Since February, 1864, she has not had a fit, and has enjoyed good health. During the time she was under treatment as many as three dozen leeches were applied to her temples.

The two following cases illustrate the fatal termination which so frequently occurs when blood-letting is not employed, in consequence of an erroneous interpretation of the symptoms of vomiting and headache.

Case 10.—Threatened apoplexy, leeching advised; its use prohibited by medical attendant, fatal result.

I received a letter from a lady in the country, well describing a threatened attack of apoplexy to her little girl, aged three and half years. To this I replied on a Wednesday, and advised the immediate application of three leeches to the temple. After a few days I received the following letter from the father:—"Before receiving your answer to my wife's letter, our little girl became so much worse that we thought it right to call in a medical man in the neighbourhood, who said the child was in a very weak state; and on my getting the leeches he said he felt sure that were you present you would not allow them to be put on. On Saturday she wandered in the day time, and we sent the second time, at nine p.m., for the doctor. She had then gone into strong convulsions, which lasted until two o'clock the following morning. She never regained consciousness, nor, as the doctor assures us, sense of feeling, and died at 4.20 yesterday afternoon. The cause of death was effusion of blood upon the brain, which the doctor says must have been wrong for some time past. I think you will think I have done right in not applying the leeches under the circumstances I have named, but I am free to confess I am sorry I did not."

Case 11.—Apoplexy, interpreted as biliousness; fatal result.

Some time afterwards I was apprised of the death of a cousin of the last-mentioned case, æt. six years, by the following note. "You will be grieved to hear that we have lost our dear little boy. He has been ill since last Thursday with what the doctor has called a bilious attack. The doctor saw him yesterday at half-past twelve, and assured me there was nothing serious the matter with him; at two o'clock he was seized with a fit of convulsions, and died in two hours."

Case 12.—Apoplexy and complete hemiplegia in a child seven years

of age, apparent ill success of leeching; complete recovery after a free bleeding from the external jugular vein.

A delicate little girl, aged seven years, had been much excited on Christmas and the following day about an entertainment in which she was to participate. The next day she complained of headache, and appeared very dull and drowsy. At nine p.m. I was summoned to see her in a severe fit. She was quite insensible, her face and eyes were powerfully drawn to the left, her right arm and leg were still and lax, the left arm and leg were moved up and down convulsively. Three leeches were applied to the left temple.

10 p.m.—She is no better. Three more leeches to the right temple.

11.30.—No better, said to be dying. I now opened the external jugular vein, and abstracted three fluid ounces of blood. In a few minutes the right arm was raised to the head, and the movements of the left side of the face and the limbs ceased, and consciousness was restored.

The next morning she was conscious, and her recovery proceeded without the use of any other remedy. In a fortnight she was running about as usual.

Case 13.—Severe apoplectic fit, unrelieved by purgatives, enemata, &c., speedy recovery after leeching.

On April 24th, 1871, a little girl, æt. twelve years, was seized about six p.m. with giddiness, which soon passed into insensibility. A gentleman of great medical skill was summoned to see her, and he attributed the attack to her having eaten some plum-pudding for dinner; and acting on this theory, he administered purgatives and enemata of turpentine, jalap, &c., with the effect of producing free purgation, but no subsidence of the fit. At ten p.m. I saw her. She was then quite unconscious, and was throwing herself violently about the bed, requiring three or four people to hold her. The gentleman who had been attending told me that it was an epileptoid fit passing into apoplexy. I applied eight leeches to the temples. She was partially conscious when the first four were filled, and entirely so when they were all off, which was by eleven p.m. She required no further treatment, and has since remained well.

The two next cases of apoplexy occurring to children illustrate the fatal and other sad consequences of delaying or abstaining from the use of blood-letting.

Case 14.—Apoplexy in a child aged eleven, delayed and inefficient bleeding, resulting in death in a few days.

I visited a little girl, æt. eleven, at a boarding-school a short distance from town on a Thursday. She was said to be suffering with toothache. While talking to her she abruptly left the room. On her return I enquired why she had done so? She replied she had gone to vomit. I was much concerned about this, and spoke anxiously to the governess and desired that I might be informed during the next day of what occurred, particularly as to vomiting, as I was about to leave town on Saturday. I heard nothing of her until my return on Monday afternoon, and then I found they had sent for me after my departure. The sickness had persisted, and what was thought to be toothache turned out to be headache, which became very severe. I prescribed leeches, but the mischief had gone too far, and she died in a few days.

Case 15.—Severe fits, succeeding to vomiting, no blood-letting; retention of life with complete loss of intelligence and speech.

R. D., æt. five, was taken to the Fever Hospital with scarlet fever, in December, 1864. He had dropsy afterwards; on January 18th, 1865, he had a severe fit, and was insensible from seven p.m. until two a.m. He seemed to recover and was taken from the hospital on February 4th, but he could not walk, his intellect however was not damaged. On February 12th, he was attacked with vomiting, which frequently recurred. A doctor was fetched, who administered medicine, but did not prescribe blood-letting. At ten p.m. he became insensible, and remained so until 12.30. He then had strong convulsions, which continued until nine a.m. He was brought to me two years afterwards. He had not spoken since, he knew nobody, and appeared destitute of all intelligence; he wandered about the house in a heedless manner, discharging his excreta as he walked or stood. He was hemiplegic on the right side. He partook of some cake when placed before him, but did not follow it when placed on a side table.

Case 16.—Sudden apoplectic seizure in a youth, recurring after six weeks; complete cure by free leeching on each occasion.

A young gentleman, æt. twenty, of rather delicate physique, was anxiously engaged working for an examination, the weather was hot, and he had besides undergone a good deal of exertion by walking. On May 5th, 1868, shortly after his dinner he became very giddy, the room seemed to go up and down with him; he laid his head first on the mantel-piece, then on the table, and at length

fell on the ground in a state of insensibility. There was no convulsion. He made an effort to vomit, this and the accumulation of saliva in the back of his mouth seemed to threaten him with choking. I saw him within an hour, he was then lying on the ground, completely insensible and motionless. I applied six leeches, and as he was not recovered by the time these had filled, six more were applied. He then roused up sufficiently to drink something. He was then put to bed, and slept until nine a.m., when he awoke and felt pretty well. He kept the house for one day only, and then proceeded with his studies.

On June 16th, just six weeks after, and about the same time of the day, he again fell down in the drawing-room, immediately after descending the staircase. He was in precisely the same state as before. The leeches were again applied, and after a good deal of blood had been taken, in about an hour he moved, and roused up sufficiently to drink something. He was then put to bed, and slept well through the night. He awoke next morning feeling pretty well, and again remained in the house for only one day. He has remained well ever since, a period of three years.

Case 17.—Probable epilepsy, cured by free use of leeches.

On April 20th, 1861, I saw H. M., æt. seventeen. He had fits when six months old, frequently recurring until five years of age; since then, none, according to the parents' account, which seems not to be quite reliable. A fortnight ago, he vomited in bed, to-day he fell in a fit, and has since vomited. He is now sensible, but dull, and complains of his head being very painful. Pulse 80. To apply ten leeches to the temples.

21st.—Leeches bled freely, still has severe pain in the head, recurring in paroxysms, has vomited once this morning. Tongue foul. Some aperient medicine administered.

22nd.—Headache very severe to-day, it recurs in paroxysms. To apply eight leeches to the temples.

23rd.—No headache to day, feels much better.

24th.—Has been disturbed by a great noise in the street, his head is very bad to-day. Ice to the head.

25th.—Head was very bad when he awoke to-day, is better now. To apply four more leeches.

26th.—Head is well to-day, no pain.

30th.—Recovered, seems quite well.

October, 1862.—He has remained well until now, has lately had head-ache on the right side and numbness of right arm.

September, 1866.—Came to complain of severe headache when he awakes in the morning, has been very well lately. To apply five leeches to the temple.

1871.—This young man has had no fits or head symptoms since.

Case 18.—Cure of epileptic fits after many years' suffering, by repeated application of leeches.

A young man, who is now thirty-three years of age, has been subject to fits from his youth; his mother remembers that he had a fit when seven years old. When sixteen, she remembers he had a very bad one, and when at boarding school it is likely that he had fits in the night, because his bed clothes were often found much disarranged in the morning. For twelve years, certainly, he has had fits frequently, sometimes once in three weeks, and at others an interval of three months has elapsed. He has taken much medicine, and many nostrums.

In 1859, I advised the application of leeches whenever he had an attack, and this was done in a very moderate manner, sometimes two were applied, at others three.

In July, 1866, leeches were applied, and a blister to his neck; he had no fit again until October 25th, when he had a very severe one. At six p.m., I saw him just as he had recovered; he complained of severe headache. Five leeches were applied.

26th.—He had two more fits last night, and vomited very much after each, his head still aches severely. To apply six leeches.

December 31st, 1867.—No fit since last report, but felt to-day as if he were going to have one, and has had headache since. To apply four leeches.

July, 1871.—He has remained quite well ever since.

Case 19.—Threatened apoplexy, after exertion, erroneously referred to biliousness; cure by leeches.

J. M., æt. thirty, a butler. On October 26th, 1868, was in the country, and while playing a game of skittles felt giddy and vomited; he went home, and a medical man was summoned to attend him. Medicines were administered, and he was advised not to eat any meat for two months, because his illness was "biliousness." The vomiting continued, and he felt very ill. On the 31st he came to town to be under my care. I found him pale, and confused in his manner; he complained of pain, referred to right frontal region; and in reply to the question, "Where is your malady?" he said, "I could get about if my head were not so bad." He had vomited during the day, and said he should again if he attempted to get

out of bed. His tongue was clean, pulse natural, bowels well opened by medicine he had been taking. I prescribed six leeches to the right temple.

November 1st.—He is up, has no pain, neither has he vomited since the leeches were applied. He required no further treatment.

Case 20.—Apoplexy, due to cerebral hæmorrhage, treated successfully by leeches; afterwards considered syphilitic; return of symptoms, no bleeding, death.

A handsome well grown young artillery officer, æt. twenty-nine, who had been some years in India, in the summer of 1866, suffered with primary and secondary syphilis, and was well treated with calomel baths and iodide of potassium. In July, 1868, he complained of some pain in the right arm and scalp, for which he took medicines, and gained four pounds in weight in the course of a month. He was married in the middle of August, but afterwards complained of pains which yielded to iodide of potassium and sarsaparilla. In July, 1869, his wife gave birth to twins, which have thriven well, and are remarkably fine children. In September, his wife writes to me to say that “soon after he went to bed on the night of the 2nd, he felt a numbness down his left side; he got up next day quite well and was hard at work unpacking, but every two or three hours during the day he felt the same sensation, and later in the day more frequently. He consulted a medical man, who could not explain the numbness. He was low spirited, and slept for ten hours. On rising next day he found he could not use his left side. The doctor visited him, and pronounced it congestion of the brain, and prescribed ten leeches, and a blister.” A few days after she writes as follows, “My husband is going on so favorably that he thinks he will not have to go to London as he feared at first he would be obliged to do. He has partially recovered his lost power, and is progressing faster than the doctor anticipated.” He came to see me on November 2nd, having quite recovered the use of his arm, but complained of occasional severe pains in his head. Since then he has consulted two or three eminent physicians, and the last time I saw him he seemed to have been convinced that his head symptoms depended upon syphilis, and was taking remedies to cure it. In May, his wife gave birth to another very fine child, and on June 7th, he writes to say, “I am in much better health than when I was in London, it is terribly hot here, but it does not seem to have much effect on me.” I had advised him to be careful of the heat. A month afterwards, on July 7th, after having been much exposed

to the heat, in fishing and rabbit shooting, besides excitement in getting possession of a new home in the country, he was seized with headache and giddiness, which resulted in insensibility and death. No blood-letting was employed on this occasion.

I can but think that here a valuable life was sacrificed to an erroneous theory. His malady was in my opinion due to cerebral hæmorrhage, and the remedy rest and occasional leeching, whereas he was induced to believe that it was due to syphilis which was to be cured by iodide of potassium, &c. The good effect of the first leeching was very striking.

Case 21.—Apoplexy and hemiplegia, successfully treated by leeches.

A gentleman, æt. thirty-four, was engaged to be married, and he had undergone some anxiety in consequence. He had suffered headache for two months, which was always worse about two a.m., when he usually awoke in severe pain. I was called to see him at seven a.m. on February 5th, 1866. He awoke finding he had lost power in the left arm and leg, and he could not articulate. He was cool, pulse 76, tongue clean, urine free from albumen. I applied eight leeches to the temple, on the next day a blister to the neck. By the end of the month he had recovered the power in his leg and arm, and his articulation was restored. I met two eminent men in consultation in this case, one attributed it to unsatisfied sexual desire, the other to syphilis; the fact being that he had that disease two years previously, but had every reason to believe he was thoroughly cured. He returned to the country, and shortly afterwards had a severe headache, for which he applied twelve leeches, and ever since has felt well. He was married in the May following, and I have since seen him the father of two or three healthy children.

Case 22.—Threatened apoplexy, cured by leeches.

On March 1st, 1868, I saw H. F., a cook, æt. twenty-four; she awoke yesterday morning with headache and giddiness, and ever since she has been vomiting at intervals; she has been dull and sleepy all day, and her fellow servants say she does not remember what has transpired during the day. To apply six leeches.

2nd.—Is much better. Does not remember my visit last night, although she had to ascend from the kitchen to the drawing-room to see me. Does not remember the leeches being put on, but recollects their coming off. She is not now giddy.

March, 1871.—I have heard that she has remained quite well ever since.

Case 23.—Apoplexy, dependent upon cerebral hæmorrhage, not treated by blood-letting, symptoms in abeyance a fortnight, recurrence of them and speedy death.

On January 22nd, 1858, I was summoned to see a gentleman of short stature and stout, æt. forty-one. Fourteen days previously he had been seized in the street with a fit, this was attended with vomiting which persisted for two days after, together with headache and giddiness. He had remained at home ever since under the care of a medical man near whose house the illness occurred. Aperient and other medicines were administered, but no blood was taken. At seven a.m. this morning he had a fit attended with stertorous breathing and convulsions, he was cupped and somewhat recovered his consciousness. At noon he had another fit attended with convulsions, he was again cupped to twelve ounces, after which he recovered sufficiently to drink some medicine, and to say his head was bad. At four a.m., he again became insensible, with stertor, and he died at half past four.

I had known this gentleman from boyhood, and he certainly never had a fit before. He was a moderate liver, but lately had been subject to anxiety. I can but think that if he had been treated at first by means of blood-letting and rest, his life might have been saved.

Case 24.—Apoplexy from cerebral hæmorrhage, hemiplegia, free leeching, complete recovery in a week.

W. S., a butler, a well grown man, æt. forty-five, on September 20th, 1868, while stooping to take some wine from the cellaret was seized with giddiness. He felt it more or less during the next two days. On the morning of the 23rd he went to bathe in the Serpentine, and swam across twice. He returned home to breakfast hurriedly, was then very hot and perspired freely; he vomited during his walk home. Two or three times during the day he fancied he was called by some one when such was not the case, and he replied. He vomited again at dinner time, and could eat nothing. During the afternoon he vomited again, and had a delusion that his fellow servants were disagreeable to him. He was seen about his duties until about half-past five, when he went to his room; from that time he remembers nothing. Between six and seven o'clock he was found sitting on the bed with his head leaning against the wall, in a state of insensibility, foaming at the mouth. At a quarter past seven I saw him, he was quite insensible, the pupils did not respond

to the light of a candle. I applied nine leeches to the temples. At half-past eight the leeches had filled, but he was not sensible, neither had he made any voluntary movement. Five more leeches applied. During the time these were filling he roused up, moved about and spoke rationally. The right arm was numb and incapable of being raised. The leech bites having bled freely he was left for the night with a dose of cathartic medicine.

24th, half-past eight a.m.—He is awake, does not remember anything which happened last night. His head still feels confused and throbs very much. The bowels have acted freely. To apply four more leeches. One p.m.—Head is much relieved by last leeches, his right arm is still numb.

27th.—Has kept his bed until now; feels pretty well, and is desirous to go home for a few days.

October 1st.—Has been at home until now; has walked across Hyde Park, and feels somewhat giddy. His right arm is stronger, but not quite recovered. His urine is clear, and free from albumen. He is very temperate. He returned in a few days to his duties.

Case 25.—Apoplexy, gradually developed, not treated by blood-letting, resulting in death. Cerebral hæmorrhage proved by post-mortem examination.

A lady, æt. thirty-five, was married in the spring of 1867. She was remarkable for having a considerable projection of the upper jaw, which indicated that she had the habit when a child of continually sucking something, a condition to which I have invited attention as one giving rise to head symptoms. I presume it was so in this case, for she was a great sufferer with what was called neuralgia, and she called "Screwems." In fact, she suffered very much with severe headaches. She became pregnant, and in September, being then about five months advanced, she felt so ill one Sunday in church, that she could not remain the whole of the service. The next day she was still very ill with headache and vomiting, but this was accounted for by her condition. On Tuesday evening she seemed so bad that her husband insisted on having advice for her. A medical man was summoned, her symptoms were then headache, giddiness, and vomiting; some medicine was prescribed, and she went to bed. Soon afterwards she was observed to be in a fit of convulsions. She was dead in a few hours. A post-mortem examination revealed cerebral hæmorrhage to a considerable extent.

Case 26.—Apoplexy, vomiting interpreted as gastric catarrh, speedy cure by leeches.

On August 1st, 1870, I was requested to see a tradesman, æt. forty-four, who was said to be dangerously ill. I found that he had been attacked five days before, on the 27th ult., with giddiness and pain over the right eyebrow. During the 28th and 29th, he had vomited repeatedly. He had been attended by a medical man who regarded the case as one of "gastric catarrh," and administered hydrocyanic acid for its relief. On the 30th there was no vomiting. On the 31st he felt very ill, and observed that he could not see with his right eye. He was confused in his manner, and talked somewhat incoherently. He is now in bed, still rather strange in his manner, complaining of pain over the right eye and want of vision. The gentleman who has been attending him, tells me he fears he has some obscure disease of the brain, for which he has now prescribed iodide of potassium. I advised six leeches to the right temple. On the 2nd, the pain was much better. He could now see very well. On the 5th, he seemed to be quite recovered. Appetite good. Felt quite well.

There is no doubt that this case was brought about by the too free use of stimulants, and the heat of the weather.

Case 27.—Severe head symptoms, partially treated by leeches; recovery of health, with loss of sight and hearing.

A married lady, æt. thirty-four, mother of six children, was suffering, on September 29th, 1858, with intense headache and hot skin. Pulse 120. Eight leeches were applied. On the 30th, slept well, had no head-ache. Pulse 80, skin cool, is hungry. October 1st. Appears to be well. 3rd. Quite recovered. Is better now than she has been for some time past. The attacks of headache recurred, and as my treatment was not approved of, homœopathy and other plans were tried. The next note I have of her state is June 22nd, 1860. She has suffered much with severe pain of the head. On the 18th, she had a severe attack attended by vomiting, for which six leeches were applied. She has lost the vision of one eye, and that of the other is defective. On July 9th, I went with her to an eminent oculist, who recognised by means of the ophthalmoscope, œdema of retina and total loss of vision of right eye. There was also some paralysis of the muscles of the right side of face. His diagnosis was, "Tumour at base of brain on right side." From this time I prevailed upon her to apply leeches whenever she had headache and vomiting, and she did so on several occasions.

She very soon lost the sight of the other eye and the hearing of the right ear, but lately has had no more head attacks; she enjoys good health, and has no increase of her paralysis. I have attended her in four confinements since she has been totally blind. It is now more than ten years since the diagnosis of tumour was formed, and I can but think that the symptoms did not depend upon a tumour, but upon cerebral hæmorrhage, and that if the treatment had at first and all along been directed with this view, she would have been as likely to recover with her senses intact, as she now has done with the loss of sight and hearing; a deplorable condition for a strong hearty woman having the care of a family of ten children.

Case 28.—Insidious brain affection, probably cerebral hæmorrhage, objection to bleeding; subsequent employment of it, and ultimate complete recovery.

In July, 1860, I was consulted by a gentleman aged fifty, for what he called neuralgia of head and eyebrow. Taking the cue from himself I prescribed quinine; he took this for a fortnight without benefit. I then became convinced that the treatment was not good, and on the 31st advised some leeches; he objected, and we effected a compromise by applying two to one of his temples.

On August 3rd, I found he had no longer any confidence in me, and had consulted an eminent surgeon. After that, I lost sight of him for several weeks. When I next saw him, in the middle of September, he told me he had consulted seven doctors since our last meeting, and they had all condemned my having applied the two leeches.

On September 19th, he is again my patient, looking very ill, strange in his manner, cannot walk, seems to have no power over the right side of the body, still complains of pain over the eyebrows, vomited last night, and again to-day while taking a drive. I was now convinced I had to do with serious brain disease, and after what had occurred declined to adopt any plan of treatment on my own responsibility; an eminent physician was therefore summoned for consultation, but abstraction of blood was not agreed to.

On the 23rd he passed his urine and fæces in bed, and he could not support himself when out of bed.

On the 25th he was comatose, but roused up occasionally. Another consultation, but no bleeding allowed.

On the 28th he still remained comatose, and passed his urine

in bed. I became more uneasy, and suggested a consultation with another physician. This gentleman agreed better with my views as to the treatment, and we took eight ounces of blood by cupping, and applied some leeches.

On the 30th, it is noted that "he is more wakeful than he has yet been; he is clear in his mind, and cheerful to-day. For the first time, he has made water into a proper vessel."

I will not quote all the notes of this very interesting case, but the last one I made, on December 22nd, is that "He has been to Hastings for three weeks, and returned yesterday, feeling quite well in every respect. He is going to his business to-morrow unaccompanied." I am happy to be able to add to this note that this gentleman has remained well ever since, and is still actively engaged in public and private business.

Case 29.—Sudden attack of hemiplegia, most probably due to cerebral hæmorrhage, abstraction of blood by leeches, speedy recovery.

On May 4th, 1871, a lady aged sixty-six, was well when she arose in the morning; at eleven a.m., after considerable mental agitation, she suddenly found her power of speech fail her. I saw her at half-past eleven, she was then much flushed, the left cheek was obviously paralysed, the mouth being drawn to the right side; she spoke with great difficulty, and complained of difficulty also in swallowing. The left hand and arm were also paralysed. The condition of the leg I could not ascertain. She denied having any headache or giddiness, and had not vomited. Tongue clean, pulse 80, of good power. Six leeches were immediately applied to the right temple. Nothing else of importance was done, beyond keeping her in bed for a week.

On the 18th, she went down to her drawing-room, and by the end of the month had regained full power over her face, arm, and hand, and was able to go about as usual.

Case 30.—Apoplexy in an old man, quickly and effectually relieved by bleeding at the arm.

On June 18th, 1870, I saw in King's Ward, St. George's Hospital, a man aged seventy, who on the 16th inst., a very hot day, had sat for four hours in the park; he supposes the heat of the sun overpowered him, for he became insensible, and was carried to the hospital. On reaching there, he was considered to be in a hopeless condition of apoplexy. However, he was bled at the arm to twenty ounces, he soon recovered, and to-day appears well, he is quite clear in his mind. He left the hospital in a week, quite well.

Case 31.—Threatened apoplexy in an octogenarian, cure by leeches.

In June 1864, I was summoned to see a lady aged eighty-two, of thin spare habit. She was in bed, and whenever she raised her head from the pillow she vomited, and complained of giddiness. Having carefully watched her for some time, and administered some simple remedies without benefit, I determined to apply some leeches, under the conviction that if I did not in that way afford her relief, she would soon become comatose, and probably die. I applied three leeches to the temple. She was immediately relieved, the vomiting ceased, and after a few hours' sleep she was quite well. She lived four years after this attack.

I have thus recorded the particulars of thirty-one cases, comprehending individuals of both sexes and all ages, and I think that those who honour me by perusing them will admit, that they illustrate the subject of my communication, and afford some evidence that the abstraction of a little blood from the human body is not so dangerous or mischievous a proceeding as many would have us believe, but is a remedy applicable equally to the infant and octogenarian, when suffering with those symptoms which indicate its use.

To snatch a human being from impending and otherwise inevitable death by opening the jugular vein, or the prompt application of some leeches, appears to some to be a cruel or barbarous exploit, but to sit by the bed-side and choke the patient to death with brandy and water is regarded as humane, kind, and attentive. This is no exaggeration of the state of this subject at present. I have been denounced when I have felt most proud of my success, and, when I have appealed in my favour to the result, I have been met by the assertion, that there was some other way of attaining the same end, and my medical friends have endeavoured to disparage my treatment by saying, that the patients were fortunate to recover in spite of it. In following the direction of simply "keeping him quiet," I can see no scope for an exhibition of skill on the part of the physician, which is to be regretted, as from the advance of science, and the boasted increase of learning appertaining to our profession, the public reasonably look for some development of practical skill in the treatment of those emergencies in which they have to rely so entirely upon us for what we can do to help them.

III.

COMMUNICATIONS ON GENERAL AND
SOCIAL SUBJECTS.

NOTES ON THE LATE PRUSSIAN SIEGE OF PARIS.

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London, June, 1871.

DEAR SIR,

Agreeably to your request, I proceed to give a few particulars in regard to the first or Prussian Siege of Paris, which, if not precisely scientific in their nature, may at any rate serve as a variety, when contrasted with the more valuable contributions which occupy the pages of the present volume of the "Transactions of the St. Andrews Graduates' Association."

But I hardly know how to begin my narrative. As however I have adopted the epistolary form, it may be convenient to continue in the same, and give a few brief notices of such circumstances and events, having a professional interest, as presented themselves to my notice during this, one of the most important and striking events that have ever occurred in the world's history. Well, then ! In July 1870, when the armies of France were suddenly and unexpectedly put in motion towards the banks of the Rhine, there to measure strength with those of Prussia, all felt that while a struggle was about to take place, such as had never occurred before, there were many lessons of value to the interests of England, that would be learnt, whatever, in a military point of view, might be the result of the impending conflict. Among other matters on which it was considered desirable to obtain information, the nature of the measures adopted to maintain in health, to feed, and to clothe the soldiers throughout the expected campaign, were considered as of leading importance ; so also were the means of providing for the requirements of wounded and sick, their transport, or manner of disposing of them, in the event of its becoming necessary to separate them from the main body of individual army corps in the course of

service; the means of conveyance available for the removal from the field of battle, of such as should be struck down there; the kind of attendants employed in hospitals; and, generally speaking, the entire sanitary administration of the respective armies.

I had the honour of being accredited to the French army, the above particulars being among those to the study of which I was instructed to direct my attention. The government of the Emperor had given its sanction for my being sent on the duty; the army of Marshal MacMahon had already advanced considerably, was believed to be in a position to speedily overcome whatever opposition it might meet, and, after a little, to continue its onward march to a point, and that a capital, the name of which was indicated as if by universal consent. I was naturally anxious to push on as rapidly as possible, and join what was looked upon as the pattern army of Europe, commanded by a general whose reputation was in unison with that of the men he led. With this view, no sooner had I reached Paris on 2nd September, than I presented myself at the War Department, in order to obtain the requisite authority to proceed to the front. This I was promised, but as we left, the friend who accompanied me remarked, "In all probability you will not need your *sauf-conduit*; there is bad news from MacMahon, he and his army are in a most critical position." The following day, the sad news which was now only hinted at in whispers was confirmed. That army, which had proved itself invincible in Italy and in many other fields, had been broken, dispersed, or made prisoners; MacMahon was wounded and a prisoner; and the Emperor had to submit himself a captive to the monarch against whom, but a few weeks before, he had bidden defiance.

Paris was wild with excitement. All through the night of the 3rd, turbulent crowds traversed the principal streets and thoroughfares: those who understood the Parisians knew that a dangerous political movement was being organised, and all dreaded what the acts of the morrow might be. With early morning of that morrow, crowds began to assemble at intervals; revolutionary songs mingled with shouts of *A bas l'Empereur*, *Déchéance*, and *Vive la République*. Day advanced, and the excitement increased. The afternoon arrived, and the turmoil was intense. At four o'clock, the Revolution of the 4th of September had been effected, and, an unusual thing for Paris, bloodlessly, if we except four *sergents de ville*, who lost their lives in the *mêlée*. For myself, I was so far directly interested in the events which had succeeded each other so rapidly, that, with the dismissal

of the Government under whose auspices I was in Paris, my official status had been swept away. Under the circumstances, there was nothing to be done but to bide my time. The current of feeling was strong against all the measures taken by the *late* Emperor, and against those whom he had in any way, directly or indirectly, countenanced; nor was it by any means well disposed at that time to England, although, as events have since turned out, we may thank our stars that a masterly inactivity was our rule of action, instead of an opposite policy.

At first the people seemed, in the excitement of the change just effected, to forget the onward progress of events—and of men. The Parisians contented themselves in the first flush of what they called their success, in demolishing the emblems of Imperialism by which the public buildings were decorated. To the *ciphers* of the Emperor and Empress they manifested a brave antipathy, while *eagles* whether in stone or iron suffered severely at the hands of the victorious Republicans. Meantime the advance of the Prussian armies was steady and rapid; all the means of opposing them had been destroyed. As many troops as could be brought into Paris were collected as rapidly as possible; among others, the *corps d'armée* under General Vinoy entered, and encamped in the *Avenue de la Grande Armée*. Yet the fact seemed but gradually to present itself, that before many days Paris must necessarily be besieged. It was evident that only a very few days remained, wherein to make such arrangements for the defence of the capital, as could be made before its final isolation from the rest of France and from the world, by means of that terrible line of fire and steel which was closing around it. Almost everything had to be done. The defences had to be completed, the male population armed and drilled as far as circumstances permitted, arrangements completed for laying in as much food as could be obtained, and provision of all kinds made for the wounded and the sick, who it was felt would ere long be very numerous. Questions of public health presented themselves as demanding attention in the impending emergency; accordingly codes of instructions in regard to them were speedily drawn up, and in fact all practicable measures taken to insure the greatest degree of resisting power with the conservation of the health of the masses; the history of past sieges having shown that under such circumstances the occurrence of epidemic diseases is as much to be dreaded as the onslaught of the forces of the enemy.

Time will not permit me to detail at length the nature of the

regulations under which, when necessity arises, the regular army can be supplemented by the Garde Nationale. Suffice it to observe in general terms, that as all males, with a few specified exceptions, are liable to military service, so may those whose presence is not at the time required in the ranks of the line, be drawn to serve in the National Guard. Those also who have passed through their allotted term of service in the line, pass into the National Guard, pursuing their particular avocations in civil life, but liable to be called out when necessity arises—after the manner in some respects of our own militia regiments. So soon then as the newly constituted authorities had somewhat recovered from the excitement of the 4th of September, they put in force the existing regulations in respect to the *embodiment* of the National Guard, and issued certain new orders regarding them, the result being, that the entire manhood of the city was brought under the obligation of service. Some young men were drafted into what were reserve battalions of line regiments; men of all classes of society, the young and the old, sons and fathers, stood side by side in their ranks undergoing military drill; every person wore uniform, including waiters in cafés, attendants in shops, and the labourers of railway stations. Paris was suddenly transformed into one vast military citadel. The greatest activity was observed in completing and perfecting the various defences of the city. Buildings of every kind were appropriated as hospitals, partly by the *Intendance*, partly by various Societies in accordance with the convention of Geneva, set on foot for the purpose; while many private individuals intimated their intention to receive into their houses persons suffering from wounds, should the progress of events render it necessary for them to do so. Meantime a careful estimate was made of the food in store; all the cattle that could be obtained from the country around Paris were driven in to the city, and carefully placed under sheds erected for their protection; grain, straw, and hay were also collected as rapidly as possible; but not more than a few days could be made available for the purpose, and on the 18th of September, the isolation of the city was complete.

From this time onward, the occurrences in Paris furnished many valuable lessons in regard to matters of a purely military nature, as well as of others bearing upon army hygieno and surgery; and it may safely be said that never before did the medical profession prove in so direct a manner its immense importance to the public interests as on this occasion, for as with the armies which had to suc-

cumb at Sedan were the greater number of the medical officers belonging to the army, so now their places had to be taken by members of the profession in civil life, and most nobly did the latter respond to the call made upon them. Had they shown less willingness to come forward at the time they did, the consequence to the many wounded and sick who, at a subsequent period, demanded their help, would have been something too sad to contemplate.

I have said that when occasion arose, the manhood of Paris assumed arms. Unhappily the movement has, by more recent dire experience, been shown to have from the commencement had in itself several elements of danger, some of which were at the time in part foreseen, others entirely unrecognised. To first impressions there was something spirit-stirring and admirable in the movement, which seemed to unite all classes in defence against the common enemy ; it was not possible, however, to ignore the fact, that by this movement arms were being put in the hands of men who were in a large degree inimical to the rule of the newly installed Government, as they were to that which had just been deposed. Among other circumstances which were to be observed in connection with these men, one was the fact, that no more than a few days could elapse before the shopkeeper and the artisan must, in the garb of soldiers, meet in deadly conflict more trained and disciplined troops, of stronger physique than themselves, inured to battle and fatigue, and flushed with that confidence in their own powers which can only be attained by repeated and successive victories. Nor was the system according to which the National Guards were officered, free from elements of danger, the existence of which, if overlooked by those more immediately concerned, were sufficiently apparent to lookers-on. Officers of battalions as they were embodied were to a great extent selected by the men themselves ; they were, however, without any special qualification for their important position, nor did they, in many instances, pay that attention to their own training and that of the troops they were called upon to command, which a less sanguine and confident set of men would probably have done. Hour after hour throughout the day, and well through the night, crowds of these officers were to be seen in the cafés and restaurants ; while the privates and non-commissioned officers of their battalions seemed to wander unrestrained wherever they chose, except during the hours detailed for drill. Thus discipline was not learnt by them ; that bond of union between officers and men, which is an

essential element of military organisation, was not established; and when the day of battle arrived, as it did very soon, and recurred repeatedly, the results were such as—alas! for the condition of Paris and of France—are now but too well known. Young soldiers as against old soldiers had from the first not a chance of success. Officers selected by the soldiers who were to be commanded by them, could not by any possibility establish that discipline which is the basis of all military organisation, even if their technical knowledge were superior to that of the men in the ranks. Nor was it in the nature of things that officers who had not yet learnt the rudiments of their profession, and apparently took little pains to do so, could stand against a class such as those of which the Prussian army was formed, a class of well educated gentlemen, who had carefully studied army tactics and organisation as a *science*; men whose advancement in their profession did not, be it observed, depend upon the amount of ready money at their disposal, but rather upon the aptitude and attention manifested by them in their duties. These matters struck us very much at the time, and, if I mistake not, you will observe the direct bearing they have upon the present and prospective condition of our own army.

Late events have, moreover, proved that the very men, who while they were young soldiers failed when brought into contact with their more experienced enemies, became after a time so resolute and determined as to oppose a determined and prolonged resistance to the troops of the Government, against which in its time of complication they had revolted. As the siege of Paris went on, the question of food, and next to it the question of fuel, pressed themselves upon the serious attention of all. A careful estimate was made of the eatables of every kind available in the city, the result being that the supplies were considered equal to two months' consumption, yet, as everybody now knows, the siege became protracted beyond double that extent of time. The straits to which many of the poorer classes of the population were reduced being very great. As to the supply of fuel, it rapidly diminished. The approach of winter, and the great severity of winter as it advanced, told severely upon all, but chiefly upon the old and the feeble. Coal ceased to be obtainable, the great trees cut down in the Boulevarts proved next to incombustible, so that during several weeks there were thousands of people who were utterly without fuel. To give a correct idea of what the combined effects were of deficient food

and deficient fuel, I must beg you to bear in mind the great severity of the winter of 1870-1. Picture to yourself then long lines or *queues* of women and men, standing for several hours at a time near the shops of butchers, each being called in turn to receive the miserable pittance of beef, horse-flesh, salt meat, fish, or cheese, which, as a daily ration, was being served out to them. Many of the women were old, others were in delicate health, others were young mothers who had to provide sustenance for their infants, at the same time that the quantity of food given to themselves was insufficient for their individual requirements; recollect also that these persons on their return to their houses, had only cheerless, cold, and fireless homes to go to, and you will readily perceive the existence of conditions quite sufficient to explain the great mortality that prevailed among them. So long as it was possible to give the soldiers and others engaged in the defence full allowance of food, it was done, yet long before capitulation took place their allowance of food was placed under restrictions, and, as might have been expected, their physique suffered accordingly.

There were many persons, who, as the siege approached, had laid in supplies of provisions. They however were the exceptions. Like the lower orders in other cities and places that could be named, those of Paris are improvident to a degree. They had been accustomed heretofore to look merely from day to day for means of living and enjoyment, and naturally were unprepared to change their whole nature within a few hours; the worst was that from the time the siege began, they were dependent solely upon the daily supplies which they thought were to be obtained as before, but which were not. The extent to which the several classes suffered, was in proportion to the forethought they had exercised, yet it may be asserted, that long before the end of the siege, there was not a single person in Paris, whatever their social position, who did not in some manner suffer from insufficient and unsuitable food. Those who suffered least were of course the strong and healthy; they in fact who had, as it were, a surplus store of physical energy; but even those in whom the direct effects were least apparent, suffered in various respects and degrees. Loss of bulk was general in the whole population; fatigue was more readily induced by exertion than under ordinary circumstances. As appetite was at no time fully satisfied, so a degree of hunger was for some time never absent, and the lowered tone of the

system latterly was generally looked upon as one of the conditions which induced the great mortality that prevailed among the wounded. Never before had we seen such distinct evidence as now, that food really acts to the system as veritable fuel. In proportion to the rate of diminution of our supplies, the inability to resist the effects of the winter cold increased, and as in addition to want of *fuel* within we also suffered from want of fuel without, that is coals and wood, the inconveniences to which we were subjected may be readily understood. A scorbutic taint, moreover, prevailed among the besieged generally, women perhaps suffering more than men; not only was the health standard lowered, but the usual indications of scurvy appeared among them, while among some of the troops whose exposure and fatigues were greatest, a severe outbreak of land scurvy took place.

In selecting and fitting up buildings as hospitals, medical men were seldom, if ever, permitted to have a voice. Particular buildings were fixed upon by the *administration*, certain numbers of beds placed in particular apartments, and this done, surgeons were appointed to treat the patients who might be placed in those beds. As a rule, no surgeons had control over the administration of the establishment, and consequently over those collateral conditions upon which often more depends for the recovery of the patient than upon the so-called professional assistance given to him. But it is to be feared this manner of conducting hospital affairs is not peculiar to Paris; although there the evils attending it, as bearing upon the interests of the wounded, became so great, that in some of the establishments the entire control was, somewhat later in the siege, transferred to medical men, a measure that was followed by the best results. No doubt it is very necessary that the professional attendance should be the very best procurable; yet there are many circumstances under which this really constitutes the smallest and least important part of the treatment. Take for example, a hospital containing a large number of wounded, and men who have undergone surgical operations. A very days are sufficient to bring them into a condition in which little more is required than to maintain cleanliness and give good food; the former is never fully preserved in extemporised buildings, except where the orders of the medical officers are supreme; and so surely as that is not the case, pyæmia and other hospital diseases make their appearance, sweeping the inmates relentlessly away. In fact, during the terrible mortality that did prevail

among them in Paris, I was on several occasions asked, "How do you treat severe wounds in the English army?" and the answer was very simple, "We let their subjects have plenty of space, plenty of fresh air, plenty of cold water, and plenty of good food." During the greater part of the siege of Paris, the wounded had neither the one nor the other of these requirements, and the result was a very sad rate of mortality among them,—a rate of mortality, however, the precise extent of which will perhaps never be known with even approximate exactitude.

A Central Committee of Hygiene and Public Health was appointed, and from time to time throughout the siege instructions were issued by it for the guidance of the populace. Some of the instructions were certainly simple enough, others were perhaps a little more detailed. Thus the necessity of maintaining the salubrity of dwellings was inculcated, and various directions laid down as to how this was to be effected, partly by the free admission of fresh air, partly by frequent washing, and partly by the careful removal of slops and refuse of all kinds. The use of disinfectants was also inculcated, and various kinds recommended. Charcoal it was said acted in this manner by absorbing the foetid gases; salts of chlorine, by their chemical action, were destructive of the *vitality* of diseases arising from and polluting the lower parts of houses and buildings; oil of turpentine was suggested with the same object. *Phenic* or carbolic acid seems to have taken the same hold on public attention in Paris, as it has done in this country, and was recommended to be employed in various forms as a disinfectant; thus, directions were issued for using it in solution with water, and with vinegar. Permanganate of potass in solution, and tar, and pitch mixed with sand were among the substances recommended to be used for the same purpose.

At the time of Paris becoming invested, the estimated number of cattle within the city included 30,000 bullocks and 180,000 sheep. The question also presented itself, whether the more advisable plan was to preserve the animals alive, except such as were required to be slaughtered for daily consumption, or to have all slaughtered, and the meat salted or otherwise prepared for keeping. The balance of advantages was in favour of the latter, as not only did animals when kept alive require a large amount of food, and, under the conditions of a siege, were sure to fall off in condition, and in consequent value in respect to the nutritious qualities of their flesh, but they were liable to disease, and to the other risks of a state

of siege, occurring among them. On the other hand, the fact was considered, that, in the process of salting meat, its nutritious properties were impaired, that the masses of the population being unaccustomed to the use of such food, would probably suffer from it for some time, and accordingly the plan determined upon was to preserve a part of the cattle alive, and to convert another portion into salted provisions. In addition, however, to beef salted, a quantity of mutton was *preserved* by different processes; a considerable amount of horse-flesh was moreover salted for use by those who liked it, or to whom it may have been issued without their knowing its actual nature. The good counsels of the Committee of Hygiene, however, went farther. Instructions were issued as to the best method of cooking various kinds of meat and vegetables, the contingency being apparently lost sight of for the time being, that a difficulty was soon about to arise in obtaining the one or the other; and finally, very elaborate instructions appeared in regard to the particular kinds of substances, and their respective quantities, that were to be considered substitutes for each other. As to drinks, a number of instructions were laid down, some of which were sound and excellent, others however hardly to be included under either category. As to alcoholic liquors, soldiers and others were warned against excess in their use. In small quantities they were *comforting*, but in large they increased the liability to become affected by atmospheric cold, instead of increasing temperature as they were usually believed to do. *Chartreuse* seemed to be the particular kind of liquor most highly "recommended by the faculty." For general use, however, tea and coffee were the liquids recommended, much in the same way as they are taken in England, save that the addition of a little rum or brandy to each cup was suggested.

On the subject of disease, it was pointed out that in times of war the dangers from this cause are always greater than are those from battle; consequently that the necessity was urgent to use all possible prophylactic measures, although it was at the same time admitted, that the actual risks by disease were really fewer in the case of the besieged than in that of the besiegers. Of those to which the troops and population were considered more particularly liable, some were such as arose from exposure to the elements, others arising from certain infractions of hygienic rules, and to each of these a considerable amount of attention was paid by the hygienic Mentors of the city. Lastly, a variety of instructions

were issued as to the first care to be given to the wounded on the field of battle. Nor were many opportunities wanting for putting such instructions in force, and practically testing their value. Collisions between the besieged and their besiegers were of daily occurrence; casualties more or less numerous were occasioned by the "dropping" fire always going on between the advanced posts of the belligerents; and at intervals of a few weeks regular engagements took place, some upon a scale of magnitude unequalled during this or any other war. On such occasions the suddenness with which crowds of wounded were thrown upon whatever means for their succour had been provided, and the numbers in which they were brought to what was called the "second line of assistance," were alike astounding. With all the means provided by the military department, by philanthropic societies, and by individuals, it was with difficulty sometimes that their requirements were fully met; and it is not too much to assert, that had it not been for such Societies, and the exertions of individuals, they would not have been met in anything at all approaching a sufficient extent.

Unfortunately I cannot just now enter into full details in regard to the provisions for wounded instituted under the Convention of Geneva. The subject is altogether too extensive to be discussed in a communication such as this; yet, perhaps a very brief allusion to the *Red Cross* will be better than none at all. The most important of the Societies established was undoubtedly the "*Société Française de Secours aux Blessés des Armées de Terre et de Mer.*" There were several others acting more or less in unison with it, as the American, the Press, Italian, Evangelical, &c., but all these stood in relation to the principal as children to a parent. The "*Société de Secours*" dates its origin from 1866; but this is the first occasion upon which it has been fairly tested in its work; the result being, that while many points have presented themselves as demanding remodelling and alteration, the extent of good conferred by it upon the sufferers by the war, may really be said to have been incalculable. To enable you to judge of the kinds of work it undertook, and the nature of the machinery required, I briefly enumerate the heads under which the administration of the Society is carried on. (1) Medical services, (2) Services and organisation of ambulances, (3) Matériel, (4) Affairs in reference to the marine services, (5) International affairs, (6) Departmental affairs, (7) Information regarding wounded and prisoners, (8) Finances, (9) Publicity, (10) Books, (11) The committee of ladies, (12) Stewardship. Thus

you will perceive that not only is the scope of the Society very extensive, but the machinery for conducting it is of a very complicated nature. That the bodies acting under the Red Cross conferred immense benefits upon the wounded, not only during the siege of Paris, but throughout the entire campaign, is matter of public notoriety. By their means comforts were afforded to thousands of persons, who without their aid would unquestionably have been left very badly off, more particularly as regards means of transport, accommodation, food, and "comforts." Yet the question often presented itself during the war, and has done so since, whether the effects of charity have not, in regard to these Societies, really removed from the belligerent powers a responsibility which attaches to them, and ought to be fulfilled by them,—namely, that of providing for men wounded in the wars they severally engage in,—and that in doing so, assistance is really given to the powers to continue their conflict. Undoubtedly this is so to a considerable extent; but then all history of European wars teaches us the sad fact, that the arrangements made during them for the wounded, have never been upon a scale equal to their requirements, and that military commanders at the present day are too apt, as they were in earlier times, to consider a soldier, once he becomes wounded and non-effective, as so much rubbish to be dealt with anyhow. The existence of Societies under the Red Cross is a check upon this, and unquestionably saves the lives of many men who would otherwise fall victims to insufficient arrangements. Thus the benefits conferred by those Societies counterbalance the drawbacks attending them. No doubt there are many points in reference to the classes of persons who have to be employed under them, which demand early attention and change, and it is very desirable that the necessary re-organisation of the whole take place before they are called upon to act in another war. It is therefore to be hoped that a conference will meet this very year, to take the whole matter into consideration.

As to the probable effect of the Red Cross Societies upon the interests of the medical profession, my own belief is that it must sooner or later be to advance the interests of that profession. As observed in Paris, however, I cannot help thinking that in the establishments instituted under it for the benefit of the wounded, the position was not in all cases accorded to the surgeons, to which, by the important and responsible nature of their duties, they were entitled, for really they alone had the weight of responsibility for

life upon them. There were many gentlemen and ladies occupying high social positions, who made such arrangements in hospitals as they desired, but without reference to the medical men; friends visited the establishments to see how complete was the system of administration followed, but so far as the surgeons were concerned, they were considered to have no further duties to perform, than treat the occupants of particular beds; nor was it without difficulty, that on some occasions they were able to have changes made in various respects, which the necessities of the wounded demanded. "Ambulances" were on some occasions made show places more than anything else. They were the fashion for a time; and although they undoubtedly were the means of doing much good, yet they too had their *seamy side*.

I almost fear to tell you what my impressions are about the employment of women in hospitals filled with wounded men, for my views are somewhat heterodox on the subject. I may observe that, according to regulations in force in French military hospitals, *Sisters* are not supposed to attend to wounds or injuries upon the *persons* of men, their duties being distinctly limited to such offices as are not calculated to hurt female delicacy. But this did not satisfy some of the more energetic; and that their zeal was not always acceptable to their patients was, on more occasions than one, shown by the latter begging to be removed to some place or other where they would be attended by men only. I should be sorry to write otherwise than in respectful terms of the sisters and ladies, who in the time of need came to the help of the wounded; yet I cannot help thinking that the conditions are regrettable under which their services were necessary, and that the experience of the siege indicates the urgent necessity there is for the establishment of a body of men trained carefully for acting as attendants upon men in hospitals, as the similar organisation for women in this country ought, in my opinion, to be for attendants upon women. I speak only of *hospitals*. Individual sick or wounded in private life are under different circumstances. The inducements for respectable men to enter upon such duties, and adopt the life as a business, would of course have to be made considerable. That they ought to be such as to do so, however, I firmly believe, nor could I ever understand how it happens that, notwithstanding all that is said about the value of human life, the attendants upon sick and wounded men, especially those who perform those duties at night, are too often, as they are, low in character and in intellect. There is, I consider,

no one matter connected with hospital administration, that more demands attention than the question of male attendants.

Four great sorties were made at intervals during the siege, a severe battle being fought on each occasion. Thus ample opportunities were afforded of testing the efficiency of the means provided by the French War Department, for the removal of the wounded from the field, and of comparing them with the arrangements made by individual Societies for the same purpose. On the one side, there were mules carrying *cacolets* or *litters*; so-called *light* carts drawn by one horse, and meant to bring two severely wounded men from the first line of assistance; also the regulation *voiture d'ambulance*, a heavy conveyance like our omnibus, drawn by two horses. On the other side, those were elegant, light, and suitably arranged carriages, fitted up with special regard to the requirements of wounded men, well finished, well horsed, and in no way inferior in manufacture and materials to carriages of private individuals. I have sat in one of them while being driven at full gallop across a vine field, to take up its position behind a battery of mitrailleuses at their deadly work; I have returned from the field in one, a wounded man beside me, and two more slung overhead; and can therefore testify to the suitability of such carriages for their work. Yet, strange to say, no attempt was made on the part of the French to adopt a description of carriage which worked so well under the philanthropic Societies.

As to our manner of living during the continuance of the siege it may well be said to have been "promiscuous-like." I myself was comparatively fortunate in the early part of the siege; but latterly, from the fact of all kinds of food becoming exhausted, experienced the general difficulties there were in obtaining supplies. Preserved soup *palled* very much upon us after a time, and latterly could not be taken as such; meat, in whatever shape, was altogether expended, save in a few rare instances, so that our bill of fare was reduced to small dimensions. Preserved meat and pickles were not by any means bad, although not at all satisfying; ditto, ditto, stewed with *curry* powder, and eaten with rice, was decidedly savoury; nor, in the absence of meat of any kind, was curried *maccaroni* bad. A little ingenuity, moreover, enabled an old campaigner to make various excellent substitutes for some of the more popular English dishes. Thus, did we desire to have a beefsteak, then we proceeded as follows:—Dissolving a little concentrated soup in water, we allowed a hard biscuit to soak in it for a short time; after

which we proceeded to fry it, adding *almond* oil to make up for butter, fat, and olive oil, none of which were obtainable; we then added mushrooms, and ate the whole with what appetites we had,—appetites which were far beyond our available means for satisfying them. Did we desire a fresh fried sole, we added anchovy sauce instead of mushrooms! Even whitebait was by no means unknown. The small fry of fish from the Seine sold at the rate of a franc per ounce; a few of them “done” in almond oil, with a little pepper and lime juice, had only one fault,—there was so little of it. I, as a Scotchman, enjoyed a remarkable advantage from my nationality. A few pounds of oatmeal were discovered in a shop at a late period of the siege. The substance was not in use by the French themselves, and hence was left after all other articles, capable of being converted into food, had been expended. It however afforded me the means of making a breakfast for several successive days; although neither was it so palatable and free from objections as regards its digestibility, as it had been in my early years. The dearth of fuel, moreover, implied a dearth of hot water; it in turn involved difficulties in having our clothes washed, and that, a condition of dirt that was neither pleasant nor wholesome.

I cannot end these desultory notes without observing, that from the members of the medical profession in Paris, I at all times received the greatest attention, and in several instances marks of personal kindness, and I am very glad of the opportunity now afforded me to express my deep obligation for their courtesy to me.

I am, dear Sir,

Very truly yours,

C. A. GORDON.

Dr. Sedgwick,

2, Gloucester Terrace.

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